# INDEX OF SUBJECTS.

#### ABSTRACTS. 1881.

### A.

Absolute measure, determination of the ohm in, 963.

Absorptiometer, 112.

Absorption, atmospheric, rays in the solar spectrum produced by, 1.

Absorption-bands of purpurin in alum solutions, displacement of, 488.

Absorption-spectra of chrysoïdine and related azo-colouring matters, 591.

— of cobalt salts, 486, 957.
— of some metals of the yttrium and cerium groups, 349.

Absorption spectrum of ozone, 213.

Absorptive power of a soil, new method of ascertaining, 935.

Acetaldehyde with ethyl acetate, condensation of, 405.

Acetamidocumic acid, 424.

Acetates, certain, density and molecular volume of, 969.

Acetic acid, action of chlorochromic acid on, 583.

- decomposition of, by zinc-dust, 141.

lower members of. Part II, 797. Acetic acids, chlorinated, action of phos-

phorous pentasulphide on, 890.

Acetic anhydride, action of bromine on,

 action of sulphuric acid on, 716.

----- decomposition of, by zincdust, 142.

Acetic bromide, action of bromine on,

Acetic chloride, action of aluminium chloride on, 407.

— dichlor-, 1030.

Aceto-acetates, polybasic, decomposition of, by alkalis, 409.

Acetoethoxysalicylic aldehyde, 167.

Acetofluoresceïn, 811.

B-Acetoisobutyric acid and its salts,

β-Acetonaphthalide, brom-, 606.

 $\beta$ -Acetonaphthalide, nitro-, 736.

Actione, action of furfuraldehyde on, in presence of soda, 573.

— condensation of, 796.

---- formation of, 711.

- estimation of, in commercial alcohol, 211.

— dichlor-, isomeric, 1121. —  $\beta$ -dichlor-, symmetrical, 248.

Acetone base containing sulphur, 420. Acetophenone-aniline, 262.

---- bromide, 815.

- - action of primary aromatic amines on, 262

– cvanhydrin, 277.

Acetophenonecarboxylic acid, action of acetic anhydride and sodium acetate on, 733.

Acetophorone, constitution of, 422.

 $\beta$ -Acetopropionic acid, 411.

 preparation, properties, salts of, 409.

Acetopropionic acid, two homologues of, 412.

Acetoxycodeine, 1045.

Acetyl cyanide, trichlor-, some derivatives of, 153.

Acetylaesculetin, 107.

Acetylapoquinamine, 923, 924.

Acetylcuminoïn, 597.

Acetylene, orthonitro-, 275.

- series, direct addition of water to the hydrocarbons of, 883.

- tetrabromide, action of dimethylaniline on, 160.

Acetylenetetracarboxylic acid, dibrom-, ethyl salts of, 577.

Acetylhesperitic acid, 740.

Acetylhydromethylketole, 735.

Acetylmethylketole, 734.

Acetylmonoxydiphenylphthalein, 96.

Acetyl-a-naphthol, 280. a-Acetylnaphthylphenylamine, 176.

Acetylorthoamidobenzoic acid, 735.

– ---- monobrom-, 735.

Acetylpyroguaiacol, 813.

Acid from Viscum album, 441.

- new, of the  $C_nH_{2n-4}O_6$  series, 894.

Acids, influence of isomerism on the etherification of, 883.

---- of  $C_nH_{2n}O_2$  series, halogen-substituted, action of heat and water on, 574.

— of the Australian current, Leptomeria acida, 1033.

— monobasic saturated, influence of, isomerism on their etherification, 39.

Acids and alcohols, estimation of the reaction-values of the components of, 1117.

Acmite, 26.

Acrolein, derivatives of, 406.

monobrom-, action of sodium ethylate on, 1029.

Aerylic acid, chlorobrom-, and its salts, 1124, 1125.

----- dibrom-, 1124.

dibrom-, and its salts, 889, 1030.

di-iodobrom-, and its salts,
1125.
disubstituted, structure of,

1030.

1124. iodobrom-, and its salts,

---- tribrom-, 890.

- --- and its salts, 1124.

Acrylic acids, substituted, from bromopropiolic acid, 1124.

Actinic phenomenon, curious, 863, 1092. Actinism of the sun's rays, and of daylight, measurement of, 955.

Actinium, a new metal, 1104.

---- oxides, 1104.

Actinometry, slow, a simple process of, 485.

Adipic acid, 438.

Aegerine, 26.

Aeschynite, 1110.

—— crystallographic examination of,398. Assculetin, 610.

---- acetyl-derivatives of, 180.

---- composition of, 107.

—— dibrom-, 108.

Aesculin, acetyl-derivatives of, 180.

---- action of heat on, 439. ---- composition of, 107.

---- dibrom-, 108.

Air, Buff's experiments on the diathermancy of, 966.

—— compressibility of, under low pressures and at high temperatures, 1094.

---- dust in, 843.

- estimation of carbonic anhydride in, 468.

invariable production of ammonium nitrate, in the ozonation of, by moist phosphorus, 506.

Air of hospitals during yellow fever, 1179.

of rooms, carbonic oxide in, 318.
 proportion of carbonic anhydride in, 875.

Alanine from aldehyde, 796.

Albite from the Skopi in the Grisons, and from Viesch in the Valais, 551.

--- Moravian, 550.

Albumin, crystallisable, from pumpkin seeds, 625.

—— decomposition of, in plants, 634.

--- estimation of, in plants, 312.

--- quantitative estimation of, by cupric hydrate, 205.

Albuminoïds, crystalline, from different oil seeds, 833.

— in mílk, 449.

— of the kidney substance, quantitative analysis of, 661.

Albuminous substances, a new crystalline decomposition-product of, 185.

Alcameïnes, 1157. Alcamines, 1157.

Alcohol, detection of, in transparent soaps, 314.

influence of, on digestion, 752.

--- new process for the estimation of, 479.

presence of, in the animal tissues, 928.

— secondary, formation of, 401. Alcoholic ferment, nature of, 928.

Alcohols, etherification data of, 1118.

—— heat phenomena of the solution of, in water, 9.

influence of isomerism of, on the formation of ethereal salts, 36.

influence of isomerism on the etherification of, 883.

initial rate and limit of etherification of, 37.

of the allyl series, heat of combustion of, 871.

of the fatty series, heat of combustion of, 966.

-- polyhydric, 146.

— and acids, estimation of the reaction-values of the compounds of,

--- and tertiary aromatic bases, products from, 588.

Aldehydammonia and ketone derivatives, condensation-products from, 1028.

Aldehyde, action of hydrochloric acid on, 404.

— dichlor-, 407.

---- heat of formation, and of combustion of, 675.

Aldehyde hydrate, dichlor-, 407.

Aldehyde-resin, 247.

Aldehydes, action of ammonium cyanate on, 796.

- action of furfuraldehyde on, in presence of soda, 573.

--- aromatic, synthesis of, by means of chromyl chloride, 423.

— of the fatty series, heat of combustion of, 966.

- with ethyl acetate and malonate, condensation of, 405.

- and primary aromatic bases, products from, 589.

- and their derivatives, condensation-products of, 710.

Aldehydic acids, introduction of aromatic hydrocarbons into, 814, 1035.

Aldol, an oxygenated basic derivative of, 246.

preparation of, 405.

Aleurone-grains, chemical composition of, 1062

Algæ, marine, analysis of, 319.

Alkannin, 53.

—— diacetyl-, 53.

Alkalimetry with phenolphthaleïn as indicator, 848.

Alkaline iodides, action of lead peroxide on, 976.

phosphates, estimation of phosphoric oxide in, 1169.

solutions, new method for the desulphurisation of, 766.

Alkalis, chemical technology of, 854.

Alkaloïd, a new volatile, spigeline, 1153. Alkaloïdal substances found in the animal organism during life, 294.

Alkaloïds, cadaveric, or ptomaïnes, Selmi's, chemical nature of, 1046.

cinchona, action of acetic anhydride on, 615.

on, 615. action of hydrochloric acid

estimation of, in quinine wine, 204.
 from belladonna and Datura stramonium, 293.

---- from dita bark, 448.

--- influence of, on digestion, 752.

- mydriatic or pupil dilating, 446.

— nitroprussides of, 401.

of Alstonia constricta, 623.
 of cinchona bark, some, constitution of, 615.

--- of Peruvian bark, 183.

of quinetum of Darjeeling, 1154.

Alkaloïds and peptones, 832. Alkyloxanthranols, 608.

Allantoin, occurrence of, in vegetable organisms, 1061.

Alloy of lead iodide with silver iodide, expansion-coefficients of, 966.

Alloy of lead and silver in crystals from Kongsberg, of, 353.

— of platinum and iridium, 793.

Allyl alcohol, black residue obtained in the preparation of, from glycerol, 1122.

—— monobrom-, 567.

---- bromide, monobrom-, conversion of, into monobromallyl alcohol, 567.

—— iodide, 567.

— santonate, 181.

Allyl-dimethyl carbinol, heat of combustion of, 871.

Allyl-dipropyl carbinol, heat of combustion of, 871.

Allylene chloride, action of sodium and carbonic anhydride on, 793.

Allylmethylpropylcarbinol, 402. Aloes test, Bornträger's, 946.

Alstonia constricta, alkaloïds of, 623.

Alstonidine, 624.

Alstonine (chlorogenine), 623.

Alum, crystallisation of, 878.

--- reddish-white, 369.

Alumina, direct estimation of, in presence of iron, 760.

---- estimation of, 844.

native silicates of, synthetic production of, 350.

---- separation of iron from, 1082.

Aluminite, 991.

Aluminium, gases occluded in, 350.

reversal of the lines of the vapour of, 957.

—— separation of, from iron, method suggested for, 645.

---- separation of, from iron and chromium, 1081.

—— chloride and bromide, reactions of, with organic compounds, 398.

—— phosphate, 465. Alunogen, 546, 991.

Amalgams, 881.

Amaigams, 881 Amaine, 51.

---- dichromate, 51.

Amides, organic, action of hydrochloric acid on (preliminary), 42.

Amidine bases from dibasic acids, 284.

Amido-acids derived from isohydroxyvaleric acid, 713.

Amidobenzenes, substituted, action of sulphuric acid on, 91.

Amido-cinnamic acids, three isomeric, 169.

Amido-compounds, estimation of, in plants, 313.

Amidocumic acid, two modifications of, 424.

Amidophenolsulphonic acids, 92.

proof of the identity and isomerism of the various, 92.

Amines, action of heat on, 621.

aromatic, compounds of, with silver nitrate and sulphate, 1129.

—— ferrocyanides of, 261.

Ammonia, action of methyl bromide on, 1027.

--- in plants, 116.

new compounds of hydrobromic and hydriodic acids with, 972.

Ammonias, compound, separation of, 1025.

Ammonium bases, action of heat on, 570, 745.

— borocitrates, 89.

--- bromide, some properties of, 682.

--- carbonate, 414.

citrate, use of, in examination of phosphates in manure, 846.

— dichromate, action of hydrofluoric acid on, 225.

- dihydrosulphide, vapour of, 673.

--- ferric oxalate, 714.

---- ferrous oxalate, 714.

---- hydroxylamine platinocyanide, 708.

—— picrate, heat of formation of, 969.
—— rhodio-chloride, 514.

dissociation of, 343.

---- tetrachromate, 352.

Amphibole from Amelia Co., Virginia, analysis of, 538.

Amygdalic tropeïne, 420.

Amyl bromide, action of, on dimethylaniline, 584.

---- chloride, heat of formation of, 9.

Amylamine hydrochloride, inactive, 33.
Amylamines from inactive amyl alcohol,

Amylanthracene, 736.

- dihydride, 100.

Amylanthradihydride, 609.

Amylene, brom-, action of sulphuric acid on, 1114.

— nitro-, preparation and properties of, 1115.

Amylhydroanthranol, 737.

Amylmonobromanthracene, 736.

Amylmonochloranthracence, 737.

Amylolytic activity of pancreatic extracts, estimation of, 1051.

Amyloxyanthranol, preparation and derivatives of, 608.

---- chloride, 609.

Amyloxyanthrone, 100.

--- dinitro-, 100.

Analcime, 996.

--- artificial, 25.

Anamirtin, 286.

Andalusite from Brazil, 25. Andradite, 991.

Anethol, action of chlorochromic acid on, 583.

--- action of nitrous acid on, 167.

Angelic acid, hydriod-, action of zinc and sulphuric acid on, 1126.

Anglesites of Sardinia, crystalline forms of, 397.

Anhydrobenzamidoparatoluic acid, 93.

Anhydrobenzamidoethylenorthoamidophenyl ether, 1138.

Anhydrobenzoyldiamidobenzene and its nitro- and amido-compounds, 1131.

Anhydro-compounds, 1130.

Anhydrodiamidoparatolylxylene, oxidation of, 94.

Anhydrosulphamine-isophthalic acid and its salts, 51, 1038.

Anhydrosulphamine uvitic acid, 430. Anhydrotolyldiamidobenzene, 93.

Anhydrotolylketamine, 93.

Aniline, butylation of, 898.

ferroeyanide, acid and neutral, 261.

hydrochloride, action of isobutyl alcohol on, 898.

— mucate, dry distillation of, 721.

—— platinocyanide, 708. —— silver sulphate, 1129.

Aniline-black, preparation of, 1186.

Aniline-colours, detection of, in red wine, 659.

Anilines, nitro-, preparation of, 1130.

Aniluvitonic acid, constitution of 278.

Animal body, elimination of nitrogen from, 451.

---- phenol ethers in, 631.

--- charcoal, action of, in the sugar manufacture, 127.

--- economy, phenol in, 114.

---- heat, 1049.

- liquids, sterilisation of, 835.

organism during life, alkaloïdal substances found in, 294.

--- oxidation of aromatic hydrocarbons in, 632.

—————living, relation between the molecular properties of inorganic compounds and their action on,

--- system, behaviour of fungi in, 930.

Animal tissues, presence of alcohol in, 928.

Animals, feeding, importance of inorganic salts in, 1050.

· influence of light on chemical action in, 833.

Anisil, 421.

Anisilic acid, 421.

Anisoïn, 421.

Anorthite, analysis of, 698.

- production of, by the fires in the coal beds at Commentry, 690.

Authrosiderite, 990.

Authracene, action of nitrogen peroxide

- combinations of, with the oxides of nitrogen, 99.

- formation of, from anthraquinone, 607.

 synthesis of, from orthobromobenzyl bromide, 822.

synthesis of homologues of, 736.

—— tetrachlor-, 99.

- tribrom-, action of nitric acid on, 738.

— dihydride, 609.

- action of nitric acid on, 606.

– nitrate, 99.

- tetrabromide, dibrom-, action of nitric acid on, 738.

– tetrachloride, dichlor-, 99.

Anthracite, occurrence of, in an iron mine in Nordberg, Sweden, 359.

Anthraquinone, amido-, 737.

--- derivatives of, 100, 737. ---- α-diamido-, 738.

---- α-dinitro-, 737.

---- dinitrotetrabrom-, 738.

---- mononitro-, 737.

— monenitromonobrom-, 738.

Anthraquinonedimethylamidophenylsulphone, 52.

Anthraquinonesulphamide, 52.

Anthroquinonesulphanilide, 52.

Anthraquinonesulphonic acid, derivatives of, 51.

- chloride, 51.

Anthrone, dinitro-, 607.

— ethylnitro-, 607.

---- nitroso-, 99, 607.

— nitronitroso-, 607.

Anthrophyllite, supposed, analysis of,

Antimonious acid in a vesuvian product, 518.

Antimonious oxide, isodimorphism of,

Antimony, atomic weight of, 78, 512.

- oxidation of hydrochloric acid solutions of, in the atmosphere, 513.

separation of tungsten from, 1171.

Antimony oxide, discovery of, in extensive lodes at Sonora, Mexico, 518.

- phosphenyl superchloride, 98. Antimony-glance, crystallography

Apatite, Canadian, 525.

Apatite-bearing veins of Ottawa Co., Quebec, report on the minerals of, 542. Apatites, 550.

- containing manganese, analyses of, 364.

Aphrodite, 990.

cinchona alkaloïds, Apo-bases from action of acetic anhydride on, 617.

---- from cinchona alkaloïds, action of concentrated hydrochloric acid on, and the original alkaloids respectively, 618.

Apocaffeine, 614.

Apocinchonicine, 617.

Apocinchonidine, 616.

Apocinchonine, 617. Apoconquinine, 616.

Apophyllic acid, 110.

Apophyllite, crystalline structure of, 397.

- crystallography of, 397.

Apoquinamine, and its salts, 923, 924. Apoquinine, 616. Apparatus for showing the dissociation

of ammonium salts, 343.

- for skimming milk, 129. - for studying the diffusion of carbon

bisulphide in the ground, 650. ---- for the collection of nitrogen in elementary analysis, 192.

- for the estimation of nitrogen in organic compounds, 192.

- new, for use in gas analysis, 939.

Apple tree, alcoholic fermentation in the roots of, 115.

Aqueous vapour, tension of, in presence of different hygroscopic bodies, 782. Arabinose, 795.

- and lactose, identity of, 243.

Arable land, manuring experiments on,

Aralia spinosa, 105.

Araliretın, 106.

Aralein, 106.

Arbutin, action of heat on, 439.

constitution of, 610.

Arctolite, 1006.

Arfvedsonite, and some allied minerals, chemical composition of, 552.

Argento-antimonious tartrate (silver

emetic), 419.

Aromatic acids, direct introduction of carboxyl-groups into, Part IV, 1140.

- - tertiary bases, condensation products of, 587.

Aromatic bases, condensation-products of, 587.

Arsenates, a new series of, 1101.

— from Joachimsthal, 532.

Arsenic, chemical toxicology of, 311.

- detection and estimation of, in organic matter, 648.

- detection, estimation, and separation of, 195.

 distribution of, in the animal body, 1082.

 estimation of, as magnesium pyroarsenate, 467.

 metallic, use of baryta to obtain, from arsenious oxide and arsenic sulphides, 467.

- occurrence in commercial of,

caustic soda, 856.

 separation of tungsten from, 1171. Arsenious acid, new method for the estimation of, in the presence of arsenic acid, 195.

oxide, isodimorphism of, 791.

- sulphide as a poison, and its importance in judicial cases, 123.

- -- behaviour of, with iodine, at high temperatures, 686.

Arsenobenzene, 722.

--- iod-, 723.

Arsenonapthalene, 723.

Arsenosiderite, 991.

Arsinobenzoic acid, and its salts, 168. Ash in coal and coke, estimation of,

of light-coloured cod liver oil, 124.
of various parts of a plant, 837.

Asparagine, estimation of, 761.

- estimation of, in plants, 313. - optical rotatory power of, in dif-

ferent solvents, 801. Aspartic acid, optical rotatory power of, in different solvents, 801.

Aspidium rigidum, 1152.

Aspidosperma Quebracho, bark of, 294. Aspidospermine, 108.

 and paytine, supposed identity of, 622.

Aspirator, simple, 192.

Atacamite, 991.

— from Chili, 551.

- action of dilute potash on, 7.

- and the corresponding oxychloride of copper, thermic relations of, 7.

Atmosphere, grains of silica and micrococci in, 645.

- observations on, made with thallium papers, 20.

Atom, multivalent, so-called differences in the quantivalence of, 679.

Atomic migration, 400.

Atroglyceric acid and its salts, 428.

Atrolactic acid, 427.

— —— dibrom-, 814. Atronic acid, 426.

Atroninsulphone, 427. Atronol, 426.

Atronolsulphonic acid and its salts,

Atronylenesulphonic acid, 427.

Atropic acid, additive compounds of, 425, 1143.

Atropine, 293.

action of nitric acid on, 293.

Augite, analysis of, 543. – slag-like, 990.

Aurantia, 41.

Aurin, 900.

— action of ammonia on, 725.

oxidised, 725, 900.

Australian current (Leptomeria acida), acids of, 1033.

Autunite, 531.

Azelaic acid and its salts, 578.

Azelaic and suberic acids, separation and properties of mixtures of, 891.

Azobenzene, preparation of, 909.

Azobenzenecresolsulphonic acid, 42.

Azobenzenediamidotoluene, 42.

Azobenzenehydroxybenzoic acid, 41.

Azobenzenemonosulphonic acid, action of sulphuretted hydrogen on, 907. Azo-compounds, nomenclature of some,

Azo-conydrine, 746.

Azo-diphenyl, 175.

Azo-ethane, nitroso-, 895.

Azonaphthalene, diamido-, 42.

Azoxydiphenyl, 175.

Azotometer, use of, for agricultural investigations, 464.

#### B.

Bacteria, interference of, with brewing,

 $Bacterium\ termo,\ 1021.$ 

Baeyer's process for the synthesis of indigotin, 98.

Baking powder, 132.

Barbituric acid, 1033.

- --- monobromamido-, 801.

Bariochromic oxalate, 1031.

Bariochromiopotassic oxalate, 1031.

Barium, estimation of, as chromate,

- bicarbonate, dissociation of, 1096.

— cinnamate, 598.

- oxides, action of carbonic anhydride on, 878.

— oxychloride, 979.

 silicate, crystalline hydrated, 683. Bark of Alstonia spectabilis, alkaloïds

from, 447.

Bark of Aspidosperma Quebracho, 294. Bark of Sambucus canadensis, 1163. Barley, continuous cropping of, 638.

- manuring, with saltpetre, 938. - spring, as green fodder, 755.

- summer, manuring experiments, with, 1077.
  - valuation of, 946.

Barsowite, 375.

Barytes, 698.

Basalt of the Persanyer Gebirge, mineral and rock enclosures in, 703.

Basalt-tufa from Reps in Transylvania, on the bombs ("Auswürflinge") in, 703.

Base, C<sub>17</sub>H<sub>22</sub>N<sub>21</sub>, and its derivatives, 587.

- green,  $C_{24}H_{24}N_2O_2$ , 587, 588.

- NC<sub>7</sub>H<sub>15</sub>, 621.

Bases isomeric with lepidine, 919.

—— of the oxalic series, 572.

 primary aromatic, condensationproducts of, 589.

tertiary aromatic, and alcohols, products from, 588.

volatile organic, a new series of, 895.

Bast fibres, 1121.

Bastnäsite from Colorado, 364.

Batteries, improvements in, 1092.

Beans, field-, and lupines, comparison of the influence of, on the production of milk, 927.

Beauxite, 990.

Beckerite, 687.

Beech-wood tar, occurrence of a fatty acid in the paraffin of, 249.

Beer, estimation of glycerol in, 470. - influence of malt on the quality

and keeping properties of, 1090.

—— influence of, on digestion, 752. influence of oxygen on the clarify-

ing of, 951.

- prevention of the occurrence of lactic acid in, 857.

- use of maize in the preparation of, 330.

Beet, composition of "diffusion" and "press" residues from, 301.

—— cultivation of, 60, 117.

 experiments with various kinds of, 60, 301,

—— influence of heat on the growth of,

- influence of light on the growth of, 930.

- manuring experiments with, 61, 1078.
- manuring of, 61, 938.
- Scheibler's method of estimating sugar in, 851.
- ---- stable-dung as manure for, 842.

Beet, value constant for, 851.

Beet-leaves, changes produced in, by fermentation, 302.

Beet-molasses, analyses of, 1089.

- --- new fermentation of, 770. Beetroot-juice, purification of, 951.

Beet seeds, analysis of, 757.

Beet - sickness in cause of,

Beet-sugar manufacture, preservation of diffusion residues from, 932.

- - occurrence of malonic acid in the manufacture of, 800. Beets, influence of frost on the analyses

of, 1084.

Belladonna, alkaloïds from, 293.

Benzaldehyde, action of acetone on, in presence of alkalis, 889. action of nascent hydrocyanic acid

on, 277.

 compounds of acetone and methyl oxide with, 422.

---- orthomethoxypara-, 271.

--- orthomethoxyparahydroxy-, 271.

— preparation of, 423.

- with ethyl acetate, condensation of, 405.

- with ethyl malonate, condensation of, 405.

Benzamidonaphthalenes, nitro-, amido-, 1132.

Benzanilide, metanitro, separation of, from its isomerides, 1130.

— paramido-, 1130.

Benzanilides, ortho- and para-nitro-, 1130.

Benzarseniodide, 904.

Benzarsenious acid, 904.

Benzarsinie acid and its derivatives, 903.

Benzene, 495.

- action of amyl chloroxalate on,

- chlorochromic acid on, 583.
- hydrogenised palladium on, 899.

 nascent oxygen, in presence of water on, 899.

- - ozone, nascent oxygen, and hydrogen peroxide ou, 719.

- phosphorus trichloride on,

- bromo-, action of chlorochromic acid on, 583.

-- removal of carbon bisulphide from, 770, 950.

--- constitution of, 89.
--- crude coal-tar, certain volatile products in, 1128.

 derivatives, nitrogenous methylated, oxidation of, 93.

-- diazo-amido-, 262.

1232Benzene, di- and tri-nitro-, oxidation of, formula of, 159. ---- heat of combustion of, 135. —— illuminating power of, 329. - nitro-, action of chlorochromic acid on, 583. - paradiamido-, and its hydrochloride, 1130. - paradibromo-, action of chlorochromic acid on, 583. — paradichloro-, 98. Benzene-vapour, estimation of, in coalgas, 850. Benzene and dipropargyl, comparison of, Benzenedisulphonic chloride, metachloronitro-, 902. Benzenesulphonic acid, metachloronitro-, derivatives of, 902. orthochloro-, derivatives of, 902. Benzenesulphonic acids, bromorthonitro., 174. metachloronitro-, and metachloramido-, 1037. Benzenylamidotoluenemercaptan, 597. Benzerythrene, 435. Benzhydryl acetate, 596. Benzhydrylamine, 279. Benzidine, 907, 909. - action of chlorine and bromine on, 605. ---- preparation of, 909. - reactions of, 605. ---- tetrabromo-, 605. Benzidinedisulphonic acid and its salts, 428. Benzil, dinitro-, new isomeride 422. Benzoic acid, acetylorthamido-, 735. monobromacetylorthamido-, 735. --- ortho - allometa - dibromo-, 814. - --- ortho-metadibromo-, and its salts, 814. ----- orthonitro-, action of bromine on, 814. — paranitro-, action of bromine on, 729. preparation of, 423. - - preparation of, from benzoyl trichloride and water, 323. - acids, nitrosulpho-, and some of their derivatives, 1144. chloride and titanium tetrachloride, combination of, 273. ether, preparation of, 423. Benzoïn, Palembang, 101.

Benzoline, explosion of, 1181.

Benzolone, 591.

Benzonitrile, action of nascent hydrogen on, 262. Benzoparamidobenzoic acid, 94. Benzoparatoluide, amidonitro-, 1132. — diamido-, and its salts, 1132. - metamido-, action of benzoic chloride on, 1131. Benzoparatoluides, nitro-, 1131. Benzophenone, preparation of, from phenyl benzoate, 423. Benzophosphinic acid, and its salts, 603. – chloride, 604.  $\beta$ -Benzopinacolin, 434. Benzorthoamidobenzoic acid, 94. Benzostilbene, 591. Benzotoluidine, oxidation of, 94. Benzotrichloride, compounds of, with phenols and tertiary aromatic bases, 165.Benzoylazotide, 820. Benzovi cyanide and its derivatives, nitration of, 814. Benzoyl-β-naphthalide, 606. Benzoylamido-diphenyl, 176. Benzoylamidoethyleneorthonitrophenyl ether, 1138. Benzoylbenzoic acid, 600. Benzoyldimethylaniline, 165, 587. Benzoyldimethylorthotoluidine, 587. a-Benzoylnaphthylphenylamine, 176. Benzoylpropionic acid, synthesis of, 273.Benzpinacolin, 813. Benzpinacone, 813. Benzyl alcohol, parachloro-, 803. -- bromide, orthobromo, synthesis of anthracene and phenanthrene from, 822. - chloride, action of chlorochromic acid on, 581. — chloro-, 803. ---- chloromalonate, 168. compounds, parachloro-, 803, 806. cyanide, action of bromine on, at high temperatures, 47. — parachloro-, 803. — disulphide, parachloro-, 807. --- disulpho-dioxide, parachloro-, 808. — mercaptan, parachloro-, 807. ---- β-naphthyl ether, 724. - ortho- and para-cresyl ether, and nitration of, 724. -phenyl ether, and nitration of, 723.- mercaptide, parachloro-, mercury salt of, 807. —— sulphide, parachloro-, 807. --- thiocyanate, parachloro-, 804. Benzylamine, mono-, di-, and tri-, 262. Benzylamines, parachloro-, and their salte, 804.

Benzylcinchonine, 290.

Benzylcinchonine, benzylchloride, 290. Benzylenedichlorochromic acid, 581. Benzylene-dichromous acid, chloro-, 581.

Benzyl hydroxymalonic acid, 168.

Benzylidene-isopropylidenacetone, 423. Benzylidene mesityl oxide, 423.

Benzylpyrroline, and its derivatives, 721.

Benzylsulphone, diparachloro, 807.

Benzylsulphonic acid, parachloro-, and its salts, 806.

Berthierite, 990.

Beryl, a new variety of, from Elba, 1009.

Beryls, from Alexander Co., 1110.

Beth-a-Barra wood, colouring matters from, 1042.

Beurre de margarine, 209.

Bicalcium phosphate, decomposition of,

- influence of ammonia on the estimation of, 759.

Biebrich scarlet, 178.

Biguanide, synthesis of, 896.

Bilianic acid, and its salts, 750.

Biliary acids in toxicological researches, 1046.

Bilirubin, artificial production of the colouring matters of human urine from, 1056.

Biscuits, forage, analysis of, 637.

Bismuth, argentiferous, recrystallisation of, 354.

---- native, 548, 688.

- minerals, from Nordmark, in Wermland, 688.

- ores of Bolivia, Peru, and Chili,

---- peroxide, specific gravity of, 220.

— subnitrate, 141.

---- analysis of, 196.

Bismuth-glance, 548.

Bismuthite, 363, 992.

Bjelkite, 688.

Black earth of Russia, 1070.

Blastoderm of the chick. Does glycogen occur in it? 629.

Blood, effect of Maté on the gases in, 1051.

- influence of the continued use of sodium carbonate on the composition of, 1161.

- menstrual, abnormal presence of uric acid in, 1161.

physical chemistry of, 111.

Blood-crystals, 751.

Blood solution, reduced, preparation of,

Blowpipe deposits, thin, colours of, 489. Blue milk, 1055.

— sodalite, jadeite, 990.

Bodies, union of, by pressure, 498. Bog butter, composition of, 982.

Boghead coal from Residta, 688.

Boiler incrustation, 328.

Boiling points, Kopp's law of constant difference of, and vapour-tensions of homologous series, 71.

- — law of corresponding, 71.

- simple method of determining, 642.

Bolivite, 998.

Bombs ("Auswürflinge") in the basalttufa from Reps in Transylvania, 703.

Boracite, 397.

Borax, influence of, on the decomposition of proteids, 453.

Boric acid, existence of, in saline lakes and natural saline waters, 1019.

Bornträger's aloes test, 946.

Borocitrates, 88.

Boro-decitungstic acid and its sodium salts, 23.

Boro-duodecitungstic acid, 24.

Boron, position of, in the series of elementary bodies, 20.

- oxytrichloride, attempts to prepare, 682.

- and hydrogen, solid compounds of, 507.

Bowerite from New Zealand, 377. Bowlingite, 990.

Braga-beer, preparation of, 857.

Brandisite, 233.

Brandy distillery residues, composition of, 757.

Breccia, volcanic, useful for a top dressing, 1016.

Breunnerite, examination of, 523.

Brewers' grains, method of pressing,

Brewing, interference of bacteria with, 1090.

Bromanil, 1136.

Bromine, gaseous, specific heat of, 784. - solution of, as a reagent, 193.

Bromoform, 155.

Brookite, 236.

Brucine, 749.

dinitro-, 749.

Brucite, 698.

Buckwheat, analysis of, 1164.

Bunt spores, influence of temperature on the germination of, 455.

Butane, dinitro-, 1021.

- tertiary bromo-, action of trietlylamine on, 1025.

Butenylglycerol, and its derivatives, 711. Butter, 953.

- effect of oxygen on the quality of, 1184.

 estimation of the insoluble fatty acids in, 201.

1234 Butter, Tiemann's process for the manuture of, 952. — analysis, 66. Butylanthradihydride, 609. Butylbenzene, amido-, 898. - hydrochloride, amido-, 898. Butylchloral hydrate, dissociation of, Butylene, nitro-, action of strong hydrochloric acid on, 1115. - and some of its homologues, 1114. - dinitril? 1114. Butyloxanthranol, 609. - chloride, 610. Butylphenol, 898. Butyric acid, compound of calcium chloride with, 712. conversion of ethyl acetate into, 249. - -- decomposition of, by zincdust, 142. Butyrone, decomposition of, by zincdust, 142. C. Cabrerite from Laurium, note on, 691. Cacholong, 992. Cacochlor (lithiophorite), 363. Cacostrychnine, 748. Cacoteline, 749. Cacoxene, 526, 991. Cadmium, separation of zinc from, 849. —— use of, in calico-printing, 1185. - borotungstate, a solution of, of density 3.28, suitable for mineral analysis, 1168. — oxycyanides, 1116. ---- sulphide, solubility of, in ammonium sulphide, 941. ---- tungstoborate, 879. Caffeidine, 747. ethiodide, 747. ---- hydrochloride, 747. Caffeine, 614. ---- and its salts, 746, 747. ---- bromo-, 614. —— citrate of, 447. Calico-printing, use of cadmium in, 1185.Calc it c 996, 997. --- crystallographic notice of, 232. Calcium bicarbonate, dissociation of, 1096.- carbonate, bibasic, 348.

- chloride, compound of, with the

fatty acids, 712.

of, 872.

- chromate, crystallised, preparation of, 352. — cinnamate, 598. dichloracetate, 575. – glyoxylate, 575. isobutyrate, dry distillation of, 35. - phosphate, treatment of mineral and other substances containing small quantities of, 665. - succinate, decomposition of, by heat, 1031. titanate, a new, 371. - and sodium, crystallised double sulphate of, 509. Calcspar in basalt-tufa from Owener Bölle, 998. - twins, artificial, 397. Calomel, stability of, 512. Calves, results of fattening them with skim milk, 297. Calycie acid, 180. Calycin, 180. Camphic acid, 1041. Campho-carboxylic acid, 1041. Camphor, bromnitro, 438. combination of chloral hydrate with, 180. ---- cyano-, 1041. ---- liquid, 438. — new property of, 438. - nitro-, action of bromine and chlorine on, 438. oxidation-products of, 438. - reduction-products of, 100. Camphorethylimide, 284. Camphorethylimidethylimidine and its derivatives, 284. Camphoric acid, 1042. Cananga oil, 916. Cane-sugar, adulteration of, with glucose, 1089. - commercial, detection starch-sugar mechanically mixed with, in alkaline solutions, 1023. recovery of, from molasses by fermentation, 480. rotation constants of, 1023. --- specific rotation of, in different solvents, 243. the inversion of, by concentrated hydrochloric acid at the ordinary temperature, 243. Cane-sugars, influence of succinic acid on the fermentation of, 836. Cape tea, 441, 443. Caproic acid, normal, heat of combustion

Calcium chloride, hydrates of, 878.

- Carbamidacetosulphonic acid, a new derivative of thiohydantoin, 257.
- Carbamido-carbamindithioglycollic acid, 715.
- Carbaminthioglycollic acid and thiocyanacetic acid, a compound of, 715. Carica papaya, 58.
- Carbocincheromonic acid, 744.

Carboglucosic acid, 1033.

- Carbohydrates and their derivatives, optical rotatory power of, 245.
- certain, relation between crystalline form and rotatory power of,
- ---- multiples in the optical rotary powers of, 147.
- Carbon, adamantine, or diamond, preparation of, 682.
- elasticity and electric conductivity of, 776.
- magnitudes of affinity in, 679.
   native, new variety of, being the highest known member of the series of amorphous carbons, 357.
- note on, and history of the spectrum
- organic, estimation of, in potable waters, 196.
- quantivalence of, 679.
- -- refractive equivalents of, in organic compounds, 958.
- spectra of the compounds of, with hydrogen and nitrogen, 957.
- Carbon bisulphide, action of antimony pentachloride on, 239.
- — apparatus for studying the diffusion of, in the ground, 650.
- estimation of small quantities of, 308.
- purification of, 800.
- ---- removal of, from commercial benzene, 770, 950.
- solid preparation of, for vines,
- solubility of, in water, 580. Carbon chlorides, action of molecular silver on, 707.
- compounds, action of nitrogen peroxide on, 584.
- -- heat of combustion of, 10, 135, 219.
- molecular rotatory power of, 215.
- refraction equivalents of,
- --- relations between the physical properties of, and their chemical constitution, 15.
- — rotatory power of, 709. - union of by pressure, 503.
- --- various, heat of formation of, 870.

- Carbon in steel, condition of, and the effect of "hardening" upon it,
- varying condition of, and its influence on Eggertz's coloration process, 466.
- tetrachloride, action of molecular silver on, 707.
- Carbonic acid, combined, use of a new derivative of gallic acid as an indicator for the estimation of, 815.
- — ethereal salts of, 251.
- - ethereal salts of, action of phosphorous pentachloride on, 253.
- in the breath, new demonstration of, 1175.
- in water, use of Nessler's test for ammonia for the detection of,
- tetrabasic, ethereal salts of, 253.
- anhydride, action of, on potassium iodide and on ozonoscopic papers,
- — atmospheric, a source of, 72.
   atmospheric, rapid estimation of, 204.
- combination of sodium oxide with, 348.
- --- compressibility of, under low pressures and at high temperatures,
- constancy of the proportion of, in the atmosphere, 19.
- diurnal variation of, in the air, 974.
- estimation of, 943.
  estimation of, in air, 468.
- ---- evolution of, by plant roots,
- 931. -- influence of an increased
- quantity of, on the growth of plants, 1060. - - influence of light on the
- liberation of, by plants, 1060. - of the atmosphere, absorption
- of the sun's rays by, 489.
- proportion of, in the air, 875.
   spectrum of, 861.
- ethers, chloro-, 251.
- --- oxide in the air of rooms, 318.
- poisoning by, 1086. Carbonylthiocarbanilide, 905.
- Carbonylthiocarbotoluidide, 906.
- Carbostyril, 169, 171. - amido-, 598.
- Carboxyl, direct introduction of, into phenols and aromatic acids, 265, 1140. Carpholite, 990.
- Carvacrol, 95.
- Cassia occidentalis from Martinique, seeds of, 483.

Cassiterite or tinstone, 382, 995.

Cast-iron, action of soda on, 126.

– malleable, 766.

Catechin, acetyl derivatives of, 52.

Catechol, action of ethyl chlorocarbonate on, 48.

Caucasian petroleum, 1020.

Caustic alkalis, use of Nessler's test for ammonia for the detection of, in presence of carbonate, 940.

- soda, commercial, occurrence of arsenic and vanadium in, 856.

Celestine from the Muschelkalk of Jühnde, near Göttingen, 524.

Cells, polarised, resistance of, 958.

Celluloid, 481.

Cellulose, acetic derivatives of, 709.

Cement, 1180.

- contributions to our knowledge of,

Cementation-waters, 769.

Cements, some, composition of, 1181.

Cereals, fertilisation of, 633.

Cerite metals, distribution of, 224.

Cerium, presence of, in the coal measures of St. Etienne, 21.

group, absorption-spectra of some metals of, 349.

Cerusite, crystallography of, 232, 397.

Cetylacetic acid, 408.

Cetylmalonic acid, 408.

Ceylonite, 376. Chabasite, 531, 696.

- twin-formation and optical properties of, 398.

Chalcomenite, a new mineral, 691.

Chalybeate spring, Kingstead, St. Edmunds, analysis of the water of, 1112.

Chassignite, 395.

Cheese, 953.

--- ripening of, 1184.

- Tiemann's process for the manufacture of, 952.

Chemical affinity, 17.

determination of, 783. electromotive force, 959.

-- constitution of organic compounds in relation to their refractive power and density, 489.

— repulsion, 873, 971.

Chenopodin in coal, 107.

Chick, does glycogen occur in the blastoderm of the? 629.

Childrenite, chemical composition of, 365. - and eosphorite, relation between, 365.

Chileite, Domeyko's, 1108.

Chinaethonic acid, 631.

Chloracetic chlorides, action of zinc methide on, 401.

Chloral, transformation of, into metachloral, 248.

— alcoholate, 675.

- — heats of formation of, 676. - hydrate, combination of, with camphor, 180.

heats of formation of, 676.
vapour of, 573.

Chlorates, behaviour of, in hot solutions, 322.

Chlorides, quantitative estimation of, in urine, 643.

Chlorinated compounds, heat of formation of, 671.

Chlorine, displacement of, by bromine in potassium chloride in an atmosphere of nitrogen, 342.

- gaseous, specific heat of, 784.

preparation of, 22.

—— solution of, in water, 784.

- vapour density of, 219.

--- tetroxide, boiling point of, 345. - and ethylene, action of dif-

fused daylight on, 399.

- trioxide, 506.

Chlorite-spar, 234. Chlormelanite, 991.

Chlorocarbonic acid, conversion of, into formic acid, 248.

- ethers, 251.

Chlorochromic acid as an oxidising agent, 581.

Chloroform, formation of, from alcohol and bleaching powder, 566.

Chlorogenine (alstonine), 623.

Chloropal, 992.

Chlorphenols, disinfecting power of, 126.

Chlorophyll, influence of intermittent light on the formation of, 930.

Choke-damp, poisoning by, 853.

Cholanic acid, 750.

Tappeiner's, 926.

Cholestene (cholesterilene), 401.

Cholesterilene (cholestene), 401.

Cholestrophane, 747.

Cholic acid containing solid fatty acids,

new oxidation - product of,

 oxidation of, 294, 749, 926. Christophite from St. Agnes, Cornwall,

Chromammonium compounds, 1104.

Chromates, crystallised, preparation of,

 volume constitution of, 137. Chrome-iron, note on, 690.

Chrome-iron ore, estimation of chromium in, 942.

Chromic chloride, formation of permanently green crystals of, 352.

Chromite, nodules of, in meteoric iron from Cohahnila, 705.

Chromium, estimation of, in chromeiron ore, 942,

- estimation of, in iron and steel, 646.

reversal of the lines of the vapour of, 957.

- separation of aluminium from, 1081.

- volumetric estimation of, in presence of ferric oxide and alumina,

— barium oxalate, 576.

---- oxides, 77.

---- sesquioxide, 63.

--- action of reagents on, 21.

— sulphides, 225.

Chromous acetate, preparation of, 685. ---- bromide, iodide, and oxalate, 685.

--- preparation and properties of, 685.

 chloride, preparation and properties of, 684.

—— iodide, preparation of, 685.

— oxalate, preparation of, 685.

 sulphate, preparation and properties of, 684.

Chrysanisic acid, 724.

Chrysocolla, 932.

Chrysoidine, 725.

- and related azo-colouring matters, absorption spectra of, 591.

Chunnos potatoes from Peru, 932.

Cinchamidine, 1045.

Cinchomeronic acid and its salts, 290. Cinchona bark, constitution of some

alkaloïds of, 615.

Cinchonic acid derivatives, 742. Cinchonidine, 620.

— and its salts, 291. — di-iodalkyl-compounds of, 183.

— ethyl derivatives of, 183.

- optical estimation of, in commercial quinine sulphate, 315.

- platinochloride, 922.

purum, commercial, cinchamidine in, 1046.

--- quinate, **2**92.

— salicylate, 292. — sulphate, formula of, 291.

Cinchonine, 288.

benzyl-derivatives of, 290.
distillation of, with zinc, 446.

---- ethyl-derivatives of, 289.

— methyl-derivatives of, 289. --- benzyl chloride, 290.

---- hydrate, 290.

- diethiodide, and the action of ammonia on, 289, 290.

— dimethiodide, 289. --- ethyl bromide, 289. Cinchonine, methylbromide, 289.

 sulphates, neutral and acid, 289. a-Cinchoninesulphonic acid and its salts, 742.

Cinchotine, 830.

 (hydrocinchonine of Caventou and Willm), 620.

Cinder, basic, estimation of, in manufactured iron, 648.

Cinnabar, occurrence of, in California and Nevada, 689.

Cinnamic acid, action of hydrochloric acid on, 425.

- --- amido-, separation of ortho-, from para-, 171.

— dibromonitro-, 274.
— orthonitro-, preparation of,

---- relation of, to the indigo group, 274. - - synthesis of, from ethyl malo-

nate, 168. - acids, amido-, action of reagents on

the three isomeric, 170. — amido-, three isomeric, 169.

— chloride, 169.

Cinnamyl cyanide, 169.

Cinnamylformamide, 169. Cinnamylformic acid, 169.

Circuit, produced by the reaction current of electrolysis, and by evaporation and condensation, 1092.

Citraconic acid, 416.

— derivatives of, 1032.

— anhydride, 35, 1032. — bromo-, 416.

Citradibromopyrotartaric acid, decomposition of, 416.

Citrate of caffeine, 447.

Citric acid, action of, on phosphates, 759. - - decomposition of, by distilla-

tion, 35.

- — synthesis of, 256.

Clay. contribution to the knowledge of,

— for porcelain, composition of, 324.

---- goods, 477.

Clinophrite, 370. Clintonite group, 233.

Clouds, dust, and fog, relations between,

Clover seed, colour of, 837.

Clover sickness, 755.

Coal, 107.

—— boghead, from Resiutta, 688.

— estimation of ash in, 196.

—— estimation of sulphur in, 645. spontaneous ignition of, 482.

Coal-dust, influence of, in colliery explosions, 950.

Coal-gas, action of palladium, rhodium, and platinum on, 706.

Coal-gas, estimation of ethylene and benzene-vapour in, 850. poisoning by, 853. Coal-tar colours, identification of, 659. Coals, Canadian, 547. - of New South Wales, inorganic constituents of, 983. - some New South Wales, composition of, 980. Cobalt, qualitative separation of, from nickel, 194. — separation of, from iron, 1171. - separation of nickel from, 1082. ---- amides, 1106. ---- oxides, 77. ---- salts, absorption spectra of, 486, 957. Cobaltiferous gersdorffite from Benahanis, province of Malaga, 1110. Cocculin, 741. Cocculus indicus, constituents of the seeds of, 740. Coccus red, 130. Cocoa-nut meal, analysis of, 301. Cod liver oil, iodine-iron, analysis of, 124. - - iodine-iron, preparation of, 131. light-coloured, ash of, 124. Codeïne, 829. – methiodide, 829. Codethylene, 829. Codomethylene, 829. Coffee, analysis of, 473. — method for examination of, 1177. - products from the roasting of, 287. Coffee-oil, 100. Coffee-plant, saccharine matters in the fruit of, 127. Coke, estimation of ash in, 196. estimation of sulphur in, 645. --- pure, analysis of, 857. Collagen, chemical structure of, 294. Collidine, 56. Colliery explosions, 948. - influence of coal-dust in, Colophony, products of the distillation of, 738. Colouring matter from Beth-a-barra wood, 1042. — of Rubus chamaemorus, 129. Colouring matters, azo-, related to chrysoïdine, absorption spectra of, 591. — from resorcinol, 726.
— obtained by the action of diazo-compounds on such bodies as phlorizin, 429.

- — of human urine, with an ac-

count of their artificial production

from bilirubin and from hæmatin,

1056.

Colouring matters, use of methyl alcohol in preparing, 211. Columbite, crystalline form of, 544. Condensation, circuit produced by, 1092. Conglutin, action of salt solutions on, 1160. Conine, constitution of, 825. --- hydrobromide, 745. — hydrochloride, 745. Conquinamine and its salts, 1154, 1156. - rotatory power of, 1157. Conquinine platinochloride, 922. Convicin, 1158. Conylene, 746. Cooling-pans in distilleries, disadvantages of, 1089. Cooling power of gases and vapours, 341. Copper, deposition of, on iron in a magnetic field, 962. - from New South Wales, 992. ---- metallic, crystals of, from the mines of Coro-Coro in Bolivia, 997. - preparation of, at the "Stefanofoundry in the Zips," 768.  $\mathbf{of}$ hyposulphite sodium(Na<sub>2</sub>SO<sub>2</sub>) in the estimation of, 310. - acetate, decomposition of, in presence of water, 153. --- ores, Canadian, 546. ----- phosphorised, 368. --- oxide solution, alkaline, action of organic matter (not sugar), in cane and beet products on, 1177. — refining, 768. ----- selenite (chalcomenite), 691. — sulphate, a new basic, 524. Copper and iron, crystals of a compound of, with sulphur, from Röras, 353. Copper and zinc, separation of, by precipitation with sulphuretted hydrogen, 467. Coquimbite, 397. Coral-reef, 1011. Coral-limestone, 392. --- &c., from the South Sca Islands, composition of, 1011. Corallin, crystallisable constituents of, 725, 899. Corallin-phthalin, 899. Cordierite, 549. Cork-tar, 1040. Corn, a new kind of: djugara, 1065. Corn-cockle seeds, presence of, in meals, Corned beef of the St. Louis Canning Company, analysis of, 211. Corundiferous felspar of Biella, in Piedmont, 384. Corundum of Biella, in Piedmont, 385. Cotarnamic acid, hydrochloride of, 445. Cotarnine, 445. Cotton seed meal as fodder for milch

cows, 636.

Covellin, occurring as encrusting pseudomorph on a bronze Celtic axe found on the Salsberg, near Hallstadt, 227.

Cows, feeding of, with rice meal, 297. - milch, American, flesh-meal for,

758. cotton-seed meal as fodder

for, 636. quantity and quality of milk yielded

by different races of, 630.

 Tyrolese, milk of, 1163. Crater, products from a, 237.

Cream from De Laval's centrifugal sepa-

rator, composition of, 771. Cresol, amido-, action of sodium formate on, 593.

- derivatives, 592.

- ortho-, meta-, and para-, action of ethyl chlorocarbonate on, 48.

Cresols, mono- and di-nitro-, 593.

— nitro-, 725.

Cresoxymethylene-phthalyl, 733.

Cress, manuring of, with dicalcium phosphate on soils free from humus, 462.

Crocoite-group, 1109.

Crocydolite, 553, 990.

Crops, rotation of, 639.

Crotonaldehyde and its derivatives, condensation products of, 710.

preparation of, 405.

a- and β-Crotonic acid, monobromo-, 798.

Crotonyl alcohol, 710.

— chloral, production of, 711. — iodide, 711.

"Cry of tin," phenomenon commonly called, 783.

Cryohydrates, Guthrie's, 216.

Cryptolite, 991.

Crystallisation by thermo-reduction, 687.

Crystallographic notices, 397.

Crystallography, analytical geometric treatment of, 398.

Crystals, hemimorphous, development of polar electricity in, by alteration of pressure in the direction of the symmetrical axes, 958.

variability of the angles of, 356.

Cumic acid, amido-, and some of its salts, 276.

Cuminil, 421.

Cuminilic acid, 421.

Cuminoïn, 421, 597.

Cupric antimony, incandescence of, when heated strongly, 513.

hydrate, decomposition of sodium

salts by, 978.

reduction of, in neutral and acid mixtures by grape-sugar, 795.

Cupronine hydrobromide, 446.

Cuprous chloride, thermo-chemistry of,

iodide, heat of formation of, 7.

Curação guano, 61.

Curcumin, 610.

Currents, absolute measurements of, by electrolysis, 958.

Cyanethine, action of mineral acids on,

- and new bases derived from it, 54. Cyamte, 545.

crystal-system of, 548.

Cyanocamphor, 1041.

Cymene, action of chlorochromic acid on, 582.

action of nitrogen peroxide on,

 conversion of terebenthene into, 39.

- new, remarks on Kelbe's discovery of, in light resin oil (resin spirit), 40.

Cymenesulphonamide, bromo-, 594. Cymenesulphonic acid, bromo-, and its salts, 594.

- acids, 174.

- and their salts, 602.

– chloride, bromo-, 594. Cyclopia-fluorescin, 442, 443.

Cyclopia-red, 442. Cyclopic acid, 443.

Cyclopin, 442.

#### D.

Damiana, analysis of, 106.

Daniell's cell, influence of concentration of the solutions on the electromotive force of, 335.

Darnel and lucerne, as a mixture for meadows, 1065.

Datura stramonium, alkaloids from,

Daubréelite, a new mineral, 705.

Daylight, measurement of the actinism of, 955.

Deciline, 1021.

Decipium, 979.

absorption-spectrum of, 349.

Dehydrocholic acid, 625.

Demantoid from the Urals, analysis of, 697.

Density of certain acetates, 969.

Deoxyalizarin, 823.

Deoxybenzoin, action of nitric acid on, 813.

dinitro-derivatives of, 422.

Deoxycuminoïn, 421.

Descloizite (?), 1108.

 composition and crystalline form of, 1000, 1001.

Desmin, relation of phillipsite to, 695. Developers, new, for silver bromine dry plates, 317.

Dextrin, conversion of glucose into, 570. Diabase, periodotiferous, of Mosso in the Biellese, 388.

Diabetic urine, 1162.

Diacetaesculin, dibrom-, 108.

- tribrom-, 108. Diacetic catechin and its derivatives, 53. Diacetylaurın, 900.

Diacetyldiphenol, 912.

Diacetyl-y-diphenyl, 910.

Diacetylhydrazobenzene, 909. Diacetylresorcinol, 591.

Diadochite from the Védrin Mine, 999.

- (phosphato-sulphate of iron), two varieties of, found in the coal mine at Peychagnard (Isère), 999.

Dialdane, action of ammonia on, 246.

Diallage, analysis of, 537.

Diallyl, heat of formation of, 674. - carbinol, methyl and ethyl ethers

Diallylene monobromide, 565.

Diallylethylalcamine, 1158.

Dialtylmaionic acid, a neutral bromide from, 577.

Diallyl-methyl carbinol, formation of  $\beta$ -methoxyglutaric acid from, 414.

heat of combustion of,

Diamond, artificial production of, 1019.

 colours of, in polarised light, 357. or adamantine carbon, preparation of, 682.

- refraction equivalent of, 333.

Diamylamine, and its salts, 34.

Diapocinchonine, 617. Diaspore from the Greiner, 551.

Diastase, effects of, on starch-paste, 1024.

fermenting power of, 115.

---- of Kôji, 1059.

Diastasimetry, 1051.

Diazo-amido-benzene, 262.

Diazobenzene, chloride of nitrosomethylnitro-, 730.

— nitrate, 809. — thermal constants of, 809.

Diazo-compounds, 262.

Diazoresorcinol, and the ethyl ether of,

Dibenzarsenious iodide, 905.

Dibenzarsinic acid, 904.

Dibenzhydrylamine, 279.

Dibenzoyl-pyroguaiacol, 813.

Dibenzyl, products accompanying it in the aluminium chloride reaction, 913.

Dibenzylamido-ether, 1138.

Dibenzylglycollic acid, 174.

- — and its derivatives, 1036.

Dibenzylglycollic acid, nitril of, 174.

Dibenzylidene-acetone, 423.

Dicarbinols, 82.

Dicarbonyldinaphthylene, and its halogen derivates, 280.

Dicarbotetracarbonic acid, ethyl salt of,

Dicetylacetic acid, 409.

Dicetylmalonic acid, 409.

Dichlorhydrin, and its oxidation products, 1120.

Dicodethylene, 1045.

- hydrochloride, 1045.

Didymium tungstate, 225.

Dielectric capacity of liquids, 963.

Dies, steel for the manufacture of, 856.

Diethoxydroxycaffeine, 614.

Diethyl phenyldioxycarbonate, 48.

phthalate, 1147.

Diethylacetic acid, calcium and barium salts of, 408.

Diethylamine diethyloxamate, 718.

- platinocyanide, 707.

Diethylbenzene, action of chlorochromic acid on, 582.

Diethylcarbamic chloride, 719.

Diethylcarbamine cyanide, 717.

Diethylcinchonine, 289.

Diethylcollidine dicarboxylate, 1029.

Diethyldimethylammonium methylsulphate, 241.

Diethyleneorthonitrophenyl ether, imido-, 1138.

Diethylenephenyl ether hydrobromide, trinitro-, 1137.

Diethylformamide, 718.

- action of phosphorus pentachloride on, 719.

Diethylfumaramide, action of phosphorus pentachloride on, 285.

Diethyl ketone, 895.

Diethylmalonamide, action of phosphorus pentachloride on, 285.

Diethyloxamic acid, chloride of, 719. preparation of, 717, 718.

a-Diethylphenylpropionic acid, 1035.

Diffusion of liquids, influence of voltaic currents on, 963.

- application of photometry to the study of, 956.

Diffusion residue, nutritive value of, 933. - from beet, composition of,

301. - from beet-sugar manufacture,

preservation of, 932.
"Diffusion" and "press" residues as

food, comparison of, 757. changes of temperature Digestion,

during, 926. effect of alumina salts on, 189.

- influence of alcohol, beer, and wine on, 752.

Digestion, influence of certain salts and alkaloïds on, 752, 834.

influence of malt-liquors 752.

Dihydroanthranol, formation of, from anthraguinone, 607.

Dihydroxybenzhydrol, 592.

Dihydroxybenzoic acid, 584, 818.

a-Dihydroxybenzoic acid and its salts, 265.

Dihydroxybenzoic acid (second) and its salts, 266.

Dihydroxyfumaric acid, Tanatar's, 156. Dihydroxylarsinobenzoic acid, 168.

Dihydroxynaphthalenedisulphonic acid,

Dihydroxyphenylene cyanurate, 95.

Dihydroxythymoquinone, 596.

Diimidomononitril, 820.

 hydrochloride, action of hydrochloric acid on, 820.

Diiododiphenylthiocarbamide, 175.

Diisopropyl ketone, action of chlorine on,

- mono-, di-, and tri-chloro-, 34. Dimethoxybenzophenone, 422.

Dimethyl carbonate, 88.

ether, combination of, with hydrochloric acid, dissociation of, 1096.

---- α-hydroxyuvitate, 278.

– pulvate, 97.

Dimethylamidotriphenylmethane, 588. Dimethylamine, action of sulphuryl chloride on, 716.

- preparation of, 1027.

Dimethylaniline, action of amyl bromide on, 584.

- action of aromatic acids, of alcohols, aldehydes on, 587, 588, 589.

---- action of nitric oxide on, 161. action of, on ethylene bromide and acetylene tetrabromide, 160.

· ethiodide, decomposition of, by potash, 584.

- ferrocyanide, acid, 261.

- hydrochloride, nitroso-, action of, on phenolsurphonic acids which do not contain the methyl-group, 161.

- hydrochloride, nitroso-, action of, on sodium  $\beta$ -naphtholsulphonate, 161. - methiodide, decomposition of, by potash, 584.

Dimethylanilinephthaleïn, 587.

– hexnit**r**o-, 588.

Dimethylanilinephthalin, 588.

Dimethylanthracene, 1129.

Dimethylarsinic acid, oxidation of, 905. Dimethylbarbituric acid, 1033.

Dimethylconine, 745.

Dimethylconylammonium iodide, 745.

Dimethylethylazonium chloride, 152.

Dimethylethylearbinol, wash-waters of

the crude product of the nitration of,

Dimethyl-ethylene, 239.

Dimethylhydrazine, and some of its derivatives, 151.

Dimethylisopropylcarbinol, 401.

Dimethylketine, 895.

Dimethylmetatoluidine, action of bromacetylbenzene on, 722.

Dimethylnaphthol, 53.

Dimethyl- $\beta$ -naphthylamine, 177.

Dimethylnitrosamine, 152.

Dimethylparabanic acid, 747.

Dimethylpiperidine, constitution of, 622. Dimethylpiperylammonium hydroxide,

action of heat on, 571.

Dimethylpiperyl iodide, 621. Dimethylquinol, amido-, 595.

- — derivatives of, 272.

 diamido-, hydrochloride of, 272.

— mononitro-, 595.

Dimethylquinol-disulphonic acid and its salts, 272.

Dimethylresorcinol, 269, 270.

· dibromo-, 270.

Dimethyl- $\beta$ -resorcyl aldehyde, 271.

Dimethylsuccinamide, action of phosphorus pentachloride on, 285.

Dimethylsulphocarbazinic scid, 152. Dimethyltetrallydroxyanthraquinone, 1142.

Dimethylurea, symmetrical, 747.

Dimethyluric acid, oxidation-products of, 39.

β-Dinaphthalene oxide, 264.

Dinaphthylene oxide,  $\alpha$ - and  $\beta$ -, and their derivatives, 281.

 $\alpha$ - and  $\beta$ -Dinaphthylethylene ether, 177, 178.

Dinaphthylmethane, 281.

 $\beta$ -Dinaphthylmethylene ether, 177.

β-Di-naphthylthiocarbamide, 606.

Diopside (pyroxene), artificial, 694.

Dioptase, 551.

Dioxyacetophenone, 591.

- mononitro-, 591.

Dioxyadipic acid, 256.

Diparahydroxydiphenyl, 605. δ-Diphenyl obtained from diphenyline and phenolparasulphonic acid, 912.

Diphenyl, acetylparamido-paranitro-, 911.

— bases, 907.

derivatives, constitution of, 907.

- α- and β-diamido-, 909, 911.

— δ-diamido-, **6**04.

– diparadinitro-, 604.

— ether, 264.

 γ, from benzidine, and diphenyldiand dioxyphenylbenzoic eulphonic acids, 910, 911.

Diphenyl, isoamido-nitro-, 911. —— isobromo-, 912. —— isobromonitro-, 911. --- isodinitro-, 604, 911. —— orthonitro-, 912. ---- oxide ketone, 264. - paramido- (xenylamine), derivatives of, 175. — para- and ortho-mononitro-, 604. paramononitro-, azo-compounds of, Diphenylacetic acid, synthesis of, 273. Diphenylbenzene, trinitro-, 435. Diphenylbenzenes, 435. Diphenyldisulphonic acid, tetrazo-, 428. Diphenylenecarboxylic acid, nitro-, 435. Diphenylenephenylmethane, 434. Diphenylenetolylmethane, 434. Diphenylfumaric anhydride, 47. Diphenylfumarimide, 48. Diphenylguanylguanidine, 44. Diphenyline, 604, 911, 912. preparation of, 909. Diphenylmethane, monobromo, action of ammonia on, 279. Diphenylnaphthylmethane, 434. Diphenyloxamide, action of phosphorus pentachloride on, 718. Dipropylresorcinol and some of its derivatives, 269. – monobromo-, 269. – tetrachloro-, 269. Diquinoline, 613. - platinochloride, 613. Diresorcinol, tetranitro-, 1134. Diresorcinolketone, 812. Diresorcinolphthaleïn, 95. Diresorcinoiphthalin, 96. Disalicylamide, 42. Disalicyldiamide, 42. Dissociation: comparison of formulæ deduced from experiment, 1095. Diphenylparaxylylmethane, 434. a-Diphenylpropionic acid, 1035. Diphenylthiocarbimide, 176. Diphenylurethane, 176. Diphenyls, dinitro-, two isomeric, 604. Dipiperallylalcamine, 1158. Dipropargyl, 495, 565. polymeride of, 565. – tetriodide, 565. --- and benzene, comparison of, 719. Dipropionyl dicyanide, 154. Dipropylcarbinol, 401. Dissocioscope, 343. Distilleries, disadvantages of coolingpans in, 1089. Disulphaminebenzoic acid, 817. Disulphobenzoic acid, 817. Dita bark, alkaloids from, 448. Ditaïne, 109.

— reduction of echitamine to, 184.

Ditamine, 448. Dithioglycollic acid, and its salts, 580. Dithiotetrathiazyl, dichloride of, 976. Ditolylamine, hexanitro-, 41. tetrabrom-, 41. Ditolylethylene, 260. a-Ditolylpropionic acid, 1035. Ditolylthiocarbamide, action of carbonyl chloride on, 906. Divicin, 1159. Djugara, a new kind of corn, 1065. Dolomite of South Tyrol, 27. Double decomposition in absence water, 342. in aqueous solutions of salts, thermochemistry of, 869. refraction, influence of change of temperature and pressure on, 334. - salts of the lower members of the acetic acid series, Part II, 797. Douglasite, 227. Dracylic acid, nitro-, 422. Drainage water from moorland, 117. Dublin, mineralogy of the county of, Dufrenite from Rockbridge Co., Virginia, 1111. - from Rockbridge Co., Virginia, composition of, 529. Dunite of the Jenks mine, Macon Co., N. Carolina, 540. Duroylbenzoic acid, and its salts, 732. Dust in the air, 843. - in workshops, quantitative estimation of, 761. fog, and clouds, relations between, 970. Dye, blue, from  $\beta$ -naphtholtetrazobenzene, 178. - estimation of, in textile fabric, 1178. Dyestuff, new, 483. - allied to malachite-green, 589. Dyes from  $\beta$ -naphtholdisulphonic acids, Dynamite, estimation of nitroglycerol in, 472.

Echitamine, 448.

relation of, to ditaïne, 184.

Echitammonium hydrate, 448.

Echitenine, 448.

Egg peptone, preparation of, 450.

Eggonite, 236.

Eggs, investigation of the processes of decomposition occurring during the rotting of, 110.

Ehlite, 368.

"Eklogite" which occurs as enclosure in the diamond mines of Jagersfontain, Orange Republic, South Africa, 552.

Electric arc, electromotive force of, 958.

- conductivity of heated gases, 671. -- currents by liquid diffusion and

osmose, 963. - effects of, on the surfaces of mutual contact of aqueous solutions,

- discharge, silent, researches on, 3. - distribution as manifested by that of the radicles of electrolytes, 963.

- light, influence of, on vegetation, and on certain physical principles involved, 962.

pile, Faure's secondary, 671.

---- polarity, development of, by pressure in the hemihedral crystals with inclined faces, 2.

tension, differences of, between liquids in contact, with special reference to the state of cencentration, 491.

Electrical conductivity of saline solutions, 71.

· measurements, absolute, unit in, 334.

Electricity, atmospheric, influence of, on the growth of grapes, 931.

- discharge of, in gases and high vacua, 70.

- laws of the development of, by the action of pressure on tourmaline, 338. production of, by contact of hetero-

geneous metals, 864.

— refraction of, 963. --- thermic theory of, 70.

Electrolysis, circuit produced by the reaction current of, 1092.

- of organic substances in aqueous solutions, 215.

- thermal, 868.

Electrolytes, electric distribution as manifested by that of the radicles of, 963.

Electrolytic deposition of a metal, changes of volume accompanying, 671. estimations and separations, 1081.

—— experiments, 3, 962.

Electromotive force, determination of chemical affinity in terms of, 959.

- - thermo-electric, developed by the contact of a metal and a liquid, measure of, 336.

Eleonorite, 525.

Enamelling fancy hardware, 208.

metals, 208.

Enargite from the Matzenköpfl, near Brixlegg, in Tyrol, 397.

Enstatite from Snarum, 694.

Enzymes, 1051.

Eosphorite, 530.

and childrenite, relation between, 365.

Epichlorhydrin, action of hydriodic acid on, 1123.

 action of methylamine on, 1122. Epidote, 550.

 comparison of zoïsite with, 1004. - parallel combination of different varieties of, 379.

Epistilbite, monoclinic form to which it should be referred, 397.

Erbium and its salts, 350.

Erigeron canadense, essence of, 1151. Eriodictyon californicum, 105.

Eruptive rocks, a group of dissimilar, in Campton, New Hampshire, 701. Erythrodextrin, 570.

Erythrol, oxidation of, 402.

Essence of Erigeron canadense, 1151. — linaloes, 738.

Essential oil of hemp, 284.

- — Origanum vulgare, some con-

stituents of, 95. - Thymus serpyllum, some constituents of, 95.

Essential oils, action of, on the ultraviolet rays of the spectrum, 957. Ethane, 565.

 hexchlor-, action of molecular silver on, 707.

- derivatives, boiling points of, 399. Ethenylamidotoluenemercaptan, 597.

Ethenyltricarboxylic acid, 156.

- --- monochlor-, 156. Ether, compound of, with phosphorus

pentachloride, 33. - illuminating power of, 329.

 products from the manufacture of, 794.

Ethereal salts of carbonic acid, 251.

- --- carbonic acid, action of phosphorus pentachloride on, 253.

- - influence of isomerism of alcohols on the formation of, 36. Etheric or lampic acid, 576.

Etherification of alcohols, initial rate and limit of, 37.

Etherpyrophosphoric - dinaphtholsulphonic acid, barium salt of, 914.

Ethers, contributions to the history of, - homologous, vapour densities of, 782. - of quinol and orcinol, action of nitric acid on, 1139. Ethoxycaffeine, 614. Ethoxycumic acid, and some of its salts, Ethoxyhydroxysalicylic aldehyde, 166. Ethoxyparahydroxysaligenol, 167. Ethyl acetate, action of bromine on, 248. - conversion of, into butyric acid, 249 -decomposition of, by zinc-890. dust, 142. - acetethylideneacetate, 405. - acetoacetate and aldehydammonia, action of zinc chloride on a mixture 242.of, 1028. --- acetobenzylideneacetate, 405. - alcohol, detection of methyl alcohol in, 197. — — etherification of, 884. - amidomaleamate, 254. ---- amidomaleate, 254. --- benzoglycollate, 1127. --- benzylidenemalonate, 405. - bromacetate, action of ethyl bromide on, 576. - bromide, action of bromine on, 398. 248.- bromobutyrate, action of an alcoholate on, 801. — butyrylglycollate, 1127. - chloracetate, action of sodium ethylate on, 1127. chloride, heat of combustion of, 8. 714. and naphthalene, action of aluminium chloride on a mixture of, chlorisocrotonate, action of potassium cyanide on, 800. — chloroformyltricarboxylate, 577. — chloromaleamate, 254. --- chloromaleate, action of ammonia on, 254. — chloromalonate, 577. --- choloidate, 1161. — citraconate, 1032. diamidosuccinate, 578. --- α- and β- dibenzoylhydroxamate, - dibromosuccinate, action of am-

mouia on, 577.

cyanide, 798.

dust, 141.

- dichloracetate

-- diphenylfumarate, 48.

- ether, combination

tetrachloride with, 240.

and

- decomposition of, by zinc-

potassium

of titanium

Ethyl, ethylbenzoylhydroxamate, 571. - glycocholate, 1160. glycollates, 1127. ----- hyoglycocholate, 1161. — hyotaurocholate, 1161. --- isobutyryl glycollate, 1127. — itaconate, 1032. - malonate, action of water on, at a high temperature, 155. — mesaconate, 1032.  $-\alpha$ - and  $\beta$ - methylacetosuccinate, and their salts, 412. —— methyl carbonate, 88. - mono- and di-chlorothiacetates, — monochlorocrotonate, 413. — naphthol carbonate, 48. - nitrate, reduction of, by alcohol, nitrophenylnitrosoacetate, 730. ---- parachlorobenzylate, 808. — peroxide, 709. - phenylacetotosuccinate, 600. ---- phoronate, 797. phosphoroxychloride, 159. - phosphortetrachloride, 158. - phthalylglycollate, 1127. — propionylglycollate, 1127. - salicylglycellate, 1127. --- pyroracemate, 418. - succinate, action of bromine on, - investigation of the product of the action of bromine on, 414. sulphate, action of ammonia and amines on, 240. - tartrate, action of zinc-ethyl on, - thiocyanacetate, products of the decomposition of, 716. - tolylcarbonates, three isomeric, 48. Ethylamidobutyric acid, 87. Ethylamidocinnamic acid, action of sodium nitrate on, 599. Ethylamidoquinol hydrochloride, 1139. Ethylamine malate, action of phosphorus pentachloride on, 285. phthalimide, action of phosphorus pentachloride on, 285. pimelate, action of phosphorus pentachloride on, 285. pimelate, malate, and phthalimide, action of phosphorus pentachloride on, 285. platinocyanide, 707. - pyromucate, action of phosphorus pentachloride on, 715. Ethylamines, production and separation of, 1027. Ethylamylketone, 794. Ethylanthracene, 737. - dihydride, 100.

Ethylanthracene, dihydride, action of nitric acid on, 606.

Ethylanthradihydride, 609.

Ethlyanthrahydride-nitrate, 607.

Ethylarsenious dichloride, preparation of, 905.

Ethylarsinic acid, oxidation of, 905.

Ethylatrolactic acid, 600.

Ethylazaurolic acid, 895.

Ethylbenzene, action of chlorochromic acid on, 582.

Ethylbenzhydrolic ether, 279.

a- and β-Ethylbenzovlhydroxamic acid,

Ethylcinchonidine and its derivatives, 183.

Ethylcinchonine, 289.

ethiodide, 289.

Ethylene, action of nitric acid on, 1116. - dibrom-, action of oxygen gas on, 142.

estimation of, in coal-gas, 850.

— illuminating power of, 329.

– monobrom-, 882.

---- tribrom-, action of oxygen on, 143.

and chlorine tetroxide, action of diffused daylight on, 399.

- bromide, action of dimethylaniline on, 160.

- chlorhydrin, heat of formation of, 887.

 derivatives, boiling points of, 399. - ethers of phenol and nitrophenol, 1136.

metanitrophenyl ether, brom-, 1139.

- orthonitrophenyl ether, brom-, and amido-, 1137.

- oxide, thermochemistry action of acids on, 887.

oxides, thermal constants of, 967.

- paranitrophenyl ether, brom- and amido-, 1138, 1139. phenyl ether, brom-, 1137.

phenylorthonitrophenyl ether,

Ethylhydroanthranol, 737.

Ethylhydroxylamine, action of benzoic chloride on, 572.

– and its salts, 571.

Ethylidene chloride, action of chlorine on, 398.

 thermal constants of, 675. --- oxychloride, 404.

- --- action of ammonia on, 404.

Ethylmethylurea, 88.

Ethylnapthalene, and picrate of, 280. – tribrom-, 280.

a- and β-Naphthyl ether, nitration of

Ethylnitro-anthrone, 607.

Ethylnitro-orcinol, 1140.

Ethylnitroquinols, 1139, 1140.

Ethyloxanthranol, 607.

derivatives of, 608.

Ethyloxyanthrone, 100.

Ethylphenylacetaldehyde, 582.

Ethylphenylammonium ethylsulphate, 242.

Ethylphenyloxamide, action of phosphorus pentachloride on, 718.

Ethylphenylthiourethane, 44.

Ethylphosphordichloride and its homologues, 158.

Ethylphthalic acid, 1147.

Ethylphthalimide, action of phosphorus pentachloride on, 285.

Ethylphthalylhydroxylamine, 586.

Ethylpropylbenzene, 809. Ethylpulvic acid, 97.

Ethylpyridine, reduction of, 444.

Ethylpyruvyl ether, 1121.

Ethyltartronic acid, 577.

Ethylthiocarbimide, a new formation of, 1123.

thiocyanate, action of hydrochloric acid gas on, in presence of absol te alcohol, 811.

Ethylvinylcarbinol, heat of combustion

Ethylvinyl hydrocyanide, preparation of, 239.

Euosmite, 359.

Euphotide of Elba, 537.

Euxanthone, synthetical preparation of, 592

Euxenite, crystallographic examination of, 398.

Evaporation, circuit produced by, 1092.

studies on, 1059.

 without fusion, 133, 678. Excrement, nitrogenous constituents of,

Expansion of lead iodide, and of silverlead iodide. coefficients of, 495.

Expansion-cofficients of lead iodide, and of an alloy of lead iodide with silver iodide, 966.

Explosion produced while heating wine,

Explosives, decomposition of, in closed vessels; composition of the gases formed, 483.

— heat of formation of, 968.

## F.

Fahl-ores, Hungarian, chemical analysis of, 360. Fairfieldite, 229.

Fat, araometric method for the estima-Fir seeds, germination of, 931. tion of, in milk, 656. Fish, relation of the number of, to the estimation of, in milk, 656, 851, lime present in waters, 630. 1184.Flame of the Bunsen lamp, action of - function of, in germination, 59. the air in rendering it non-luminous, --- of animals, influence of food on 773.the constitution of, 752. Flames, some remarkable phenomena - undecomposed, estimation of, in with, 489. mixtures of fatty acids, 762. Flavescin, a new indicator, 193. Fats, saponification of, 210. Flax, successful growth of, in Saxony, Fatty acids, compound of calcium chloride with, 712. Flesh-meal, American, for milch cows, - estimation of undecomposed 758.as fodder, 302.
fattening of pi fat in mixtures of, 762. - --- tri- and tetra-basic, synthesis fattening of pigs on, 927. of, 155. Flint, 1003. oils, analysis of, 202. Flour, estimation of gluten in, 1177. Faure's secondary electric pile, 671. Fluid enclosures in topaz, 25. Fayalite, sections of, 991. – meat, 450, 4**51**. Feeding stuffs, money value of, 1067. Fluobenzoic acid, 597. Fehling's solution, as a qualitative re-Fluorescence, 70, 214. agent for sugar, 851. Fluorescent spectrum, 214. relation of various sugars to, Fluorine compounds, organic, 597. - free, in fluorspar, 785. -- standardising of, 942. Fluorspar, photo-, and thermo-electric Felspar, analysis of, 537. properties of, 215. - corundiferous, of Biella in Piedphoto-electric and thermo-electric mont, 384. properties of, 337. - from the rhombic porphyry of Fluo-salts of tellurium, 223. Christiania, 1019. Fodder, action of acid gastric juice on - from the Valley of Bagnères-dethe nitrogenous constituents of, 296. Luchon (Upper Garonne), 692. analyses of, 1165. Felspathic substance, artificial produc- composition of, 636. tion of, 383. — flesh-meal as, 302. ------ green, spring barley as, 755. Fergusonite, 382. Ferment, alcoholic, nature of, 928. — use of lupines as, 116. Fermentation, 928. Fodder plant, a new: sand vetch, 1065. Fodder plants, native, of New South alcoholic, evolution of heat during, 11. Wales, 1067. — influence of oxygen on, 479.
— of milk, 944. Fog, dust, and clouds, relations between, 970. Food, comparison of "diffusion" and — in presence of organic salts, 836. --- new method of, 126. " press" residues as, 757. — rapid alcoholic, 652. for pigs, preparation of, 302. Ferments, 1051. - influence of, on the constitution of Ferric chloride, decomposition of, by the fat of animals, 752. passing through the human body, light, 670. -- chlorides, heat of solution of, 964. absorption of, 1050. - relations between work and the ----- salts of organic acids, some, decomposition of, by light, 670. decomposition of, in the body, 114. Ferrocyanides of amines, 261. Formamides, substituted, 717. Ferrosulphochromite, 226. Formates, specific gravity and volume-Ferrous carbonate or siderite, 995. constitution of, 496. chloride, heat of solution of, 964. Formic acid, conversion of chlorocar- oxide, allotropic modifications of, bonic acid into, 248. - decomposition of, by zinc-- sucrocarbonate, 157. dust, 141. Ferruginous carbonated waters, 1112. electrolysis of, 798. - mineral from Amhurst Co., Va., Formic aldehyde, preparation of, 1123. Formo-β-naphthalide, 605. analysis of, 554. Formulæ for calculating the quantity of Fibrin peptone, preparation of, 450. Fillowite, 229. water added to diluted spirit, 1182.

Formylamido-diphenyl, 176. Formylcarboxylic acid, 1030. Forts, vitrified, examination of the materials of, 394. Fossil plants from the carboniferous strata of the Tarentaise, 390. - resins, new, from East Prussia, 687. Fossils, Bohemian chalk, 477. Fredricite, a mineral resembling the fahl-ore from Falu, 998. Freiberg lead-furnaces, 208. Freislebenite Hiendelaencina, fromSpain, 24. Frieseite, analysis of, 689. Frost, influence of, on the analyses of sugar beets, 1084. Fruit, preservation of, in winter, 132.Fruit trees, manure for, 121. - — manuring experiments on, Fumaric acid, formation of, from dibromosuccinic acid, 416. — formula of, 254.
— halogen derivatives of, 416. Fungi, behaviour of, in the animal system, 930. lower, nutrition of, 299, 1058. Furfuracroleïn, 247. Furfuraldehyde, action of acetone on, in presence of alkalis, 889. action of aldehyde on, 247.
action of, on aldehydes and acetone in presence of soda, 573. Furfurcrotonic aldehyde, 573. Furfuronitril, 715, 801. Furfurylamine, 801, 897. Furnace gases, analyses of, 939. - injurious effect of, on the forests of the Upper Harz, 1064,

G.

rendering, inactive, 474.

Furnaces, painted-glass, photo-electric

- products, two, 353.

Furze, cultivation of, 116.

regulator for, 125.

1179.

Gahnite, 549. Galena from the Morgenstein Mine, Kreis Saaspte, in Westphalia, 548. Galenobismuthite, 689. Gallacetophenone, 811. Gallic acid, new derivative of, 815. Gallium in American blendes, 997. Gallium chlorides, anhydrous, 1103. Gallocarboxylic acid and its salts, 267.

Galvanic cells, inconstant, theory of, combinations, electromotive power of, 216, 490. couple, theory of, 335. — polarisation, 775. — — strict meaning of, 490. Galvanism, thermic theory of, 777. Gardens, kitchen, rotation of crops in, 1069. Garden manuring experiments, 936. Garnet, chromiferous, found on the Pic Posetz, near the Maladetta (Pyrenees), 376. - green, from Val Malenco, 235. —— lime-iron, 698. - — ("demantoid") from Syssertzk in the Urals, 538. – pseudmorph after, 544. Garnierite from New Caledonia, 549. Gas, illuminating, Wilkinson's process for the manufacture of, from wood, 769, 954. analysis, convenient apparatus for, new apparatus for use in, 939. — notes on, 462. Gaseous matter, action of an intermittent beam of radiant heat on, 966. - mixtures, explosive, velocity of propagation of inflammation in, 971. — liquefaction of, 676. temperature of ignition of, 778.Gases, absorption of, by solids, 872, 971. acid-, rendering inactive, 305. combustion-, limits of error in analyses of, 205. compound, spectra of, 221. cooling power of, 341. — critical state of, 971. dilatation and compressibility of, under high pressures, 12. - estimation of the heat of combustion of, 779. furnace-, analyses of, 939. - heated, electric conductivity of, 671.- occluded in aluminium and magnesium, 350. permanent, determination of the densities of, 137. — solubility of solids in, 970. — specific heat of, 340.

taken from zinc-reduction tubes,

of, at high exhaustions, 971.

analyses of, 325.

Gastaldite, 553.

viscosity of, 678.

Gasoline, explosion of, 1181.

Gastaldite-eclogite from Val Tournanche, rutile in, 370. Gastric juice, abnormal presence of uric acid in, 1161. - - acid, action of, on the nitrogenous constituents of fodder, 296. Gastropoda, especially Dolium galea, formation of free sulphuric acid in, Gelatin, dry distillation of, 295. - nutritive value of, 1049. Gelose, 403. Georgio lavas, 557. Germination, function of fat in, 59. Germs contained in the air, action of ozone on, 632. Gismondine, a new occurrence of, 26. Glass, changes in, by heating, 5. —— electrostatic capacity of, 963. — technology of, 323. ---- toughened, resistance of, to flexure, resulting from the fusion of the ashes of grass, &c., microscopic study of. 692. Glaucophane, 553. Gloriosa superba, 103. Glueinum, atomic weight of, 139, 140, - properties and chemical character of, 511. Gluconic acid, new isomeride of, 893. Glucoproteïn, 1047. Glucose, action of sodium hypobromite on, 316. --- conversion of, into dextrin, 570. - estimation of, in urine, 315. — supposed synthesis of, 242. Glucoside from ivy, 440. Glucosides, decomposition of, by heat, 439. - researches on, 610. Glutamine, estimation of, in plants, Gluten, estimation of, in flour, 1177. Gluten bread, analyses of, 67. Glyceric acid, action of dehydrating agents on, 417. - - amide of, 153. - isotrichloro-, synthesis - --- synthesis of, from monochlorolactic acid, 416. — ether, 1122.

Glycerol, absorption of moisture by,

— action of soda on, 145.

— fermentation of, 82.

— estimation of, in beer, 470. — evaporation of, 1084.

708.

- action of ammonium chloride on,

117.

 nutritive value of, 114. — oxidation of, 402. --- oxidation of, by nitric acid, 1021. — quantitative estimation of, 145. —— six-carbon, 146. — synthesis of, 145. ---- triacetin of, 146. — volumetric estimation of, 1174. Glycerolphosphoric acid in human urine, 631. Glycocine silver, action of benzoic chloride on, 1144. Glycogen, action of mineral acids on, - amount of, in the liver and muscles after death, 628. does injection of sodium carbonate into the portal vein cause the disappearance of, from the liver? 627. - does it occur in the blastoderm of the chick? 629. elementary composition of, 569. — formation of, in muscle, 629. formation of, in the liver, 626. --- in the liver, influence of cold on the amount of, 627. --- influence of severe bodily exercise on the amount of, 626. — — of hybernating animals, 629. quantitative estimation of, 655. - Schtscherbakoff's A, B, C, and D, specific rotatory power of, 569. Glycogen-maltose, 567. Glycoline and its derivatives, 708. Glycollic acid, preparation of, from sugar, 251. - ether, 967. Glycollic acids, substituted, 1127. Glycols, influence of isomerism of, on the formation of their acetates, 144. Glyoxylic acid, behaviour of, with potash, 155. constitution of, 1030. Gneiss of the Morvan, sillimanite in, 1005. Gold, flashing of, 769. geological occurrence of, in Russia, 769. - mode of occurrence of, in certain minerals from the United States, 687. occurrence of, in the limestone rocks of Persia, 769. - preparation of, from sulphuretted ores, 769. presence of, in Silesia, 769. Grammatite, 996. Grandeau's theory as to the value of humus in the soil, examination of,

Glycerol, nitro-, heat of formation of.

Grandeau's theory of the fertility of a soil, 1166.

Grape-sugar from starch, 770.

Grapes, composition of various parts of, 1061.

- influence of atmospheric electricity on the growth of, 931.
- influence of light on the ripening of, 930.

mashing of, 126.

- Graphite from Ducktown, Tennessee,
- from Split Rock Plumbago Mine, New Brunswick, 545.
- Grass, newly mown, loss which it suffers when exposed to rain, 455.
- --- potassium salts as manure for, 842. Green pagodite from Georgia, 382.
- Grignon, report on the experimental plots at, in 1879, 932.
- Grosslüder mineral spring at Salzschlirf, chemical examination of, 29.

Grossularite, 992.

Guaiene, 813.

- Guanajuatite, chemical composition of, 361.
- Guanine hydrochloride, action of picric acid on, 655.

reaction, new, 655.

Guano, African, composition of, 758.

Guanylguanidines, 43.

Guanylphenylthiocarbamide, and its salts, 43.

Guanylthiocarbamide, 43.

- Guejarite, a new mineral species discovered in the district of Guejar, in the Sierra-Nevada, Andalusia, 517. – crystalline form of, 517.
- Gum, a new species of, occurring in beetroot molasses, 888.

estimation of, in wine, 199.

- Gum arabic, comparative examination of various kinds of, 212.
- resin from Arizona and California. 52.

Gummite, 1110.

Gun-cotton, heat of formation of, 342,

Gunpowder, analysis of, 193.

fired, existence of potassium thiosulphate in the solid residue of, 977. Guthrie's cryohydrates, 216.

Gutta-percha, peculiar property of, 953. Gypsum as manure, 1076.

#### H.

Hæmateïn, 611.

Hæmatin, artificial production of the colouring matters of human urine from, 1056.

Hæmoglobin, crystalline, 625.

estimation of, 112.

Hair-dyes, 67.

Halloysite, 540, 993. - from Tüffer, 693.

Halogen elements, reciprocal displacement of, 5.

Halogens, reciprocal displacement of, in absence of water, 134, 342.

vapour-density of, 872.

Haloïd acids, reciprocal displacement of,

- salts, anhydrous, action of dry hydrogen on, 6. certain, thermochemistry of,
- 219.

 some, volume relations of, 71. Halotrichite from Idria, 232. Hannayite, 231.

Hardware, fancy, enamelling, 208.

Harmotome, relation of phillipsite to,

Haughtonite, a new mica, 385.

Hausmannite, 698, 994.

Hay, Alpine, feeding value of, 1065.

Heat, application of the second proposition of the theory of, to chemical phenomena, 777.

- conduction in highly rarefied air, 966.

effects of, on the chloride, bromide, and iodide of silver, and on some chlorobromiodides of silver, 965.

 influence of, on the growth of beets and potatoes, 633.

- mechanical equivalent of, 491. - radiant, action of an intermittent beam of, on gaseous matter, 966.

- of combustion of alcohols of the allyl series, 871.

– —— of benzene, 135.

of carbon compounds, 10, 135, 219.

- of carbonic oxide, marsh-gas, of certain alcohols and alde-

hydes of the fatty series, 966.

- — of gases, estimation of, 779. - -- of heptane and hexahydrotoluene, 1113.

- — of some compounds of the fatty series, 9.

-- of formation of amyl chloride, 9.

of carbon compounds, 870.
of chloride, bromide, and iodide of sulphur, 673.

— of cuprous chloride, 7.

— of cuprous iodide, 7.
— of diallyl, chlorinated compounds and aldeligde, 674.

of explosives, 968.

Heat of formation of hydrogen persulphide, 492. - of magnetic oxide of iron, 219. of mercury fulminate, 780.
of pyrogenic hydrocarbons, of sulphides from the base, and hydrogen sulphide, 493. of sulphur oxides, 673.
of the oxides of nitrogen and of sulphur, 6. of vaporisation of sulphuric anhydride, 876. - phenomena of the solution of alcohols in water, and of water in alco-Heats of formation and of solution of the alkaline polysulphides, 492. - of oxidation of the sulphides, 493. Heavy metals of the ammonium sulphide group, separation of, 122. Heavy spar from the basalt of the Finkenberg near Küdinghofen, opposite Bonn, 550. Hedyphane containing baryta, from Laangban, 531. Helicin, action of heat on, 439. - modification of, 439. Hematite and brown hematite, 993. Hemialbumose, 1062. Hemicollin, 294. Hemihedral crystals with inclined faces, electrical phenomena of, 339. - - with inclined faces, polar electricity of, 338. Hemp, essential oil of, 284. - steeping, 132. Heptane from Pinus sabiniana, derivatives of, 82. - heat of combustion of, 1113. Heptolic acid, 255. Heptyl acetoacetate, 82. —— bromide, 82. – iodide, 82. – malonate, 82. Heptylacetic acid, 82. Heptylidene, 1032. Heptylmalonic acid, 82. Herrengrundite, a new basic copper sulphate, 524. Hesperetin, 739. Hesperetol, 740. trioxide on, 1084. Hesperidin and its derivatives, 739. 222.Hesperitic acid, 740. dissociation of, 1096.
new compounds of, with am-Heterosite, blue, 550. Heulandite (stilbite) from Kerguelen's Island, 695. monia, 972. Hexhydroethylpyridine, ethylated, 444. Hydroanthracene nitrite, 606. Hexhydrotoluene, heat of combustion Hydrobenzamide, action of hydrocyanic acid on, 168, 820. of, 1113.

Hexmethylbenzene, 260. synthesis of, 40. Hexmethylethane, 399. Hexolic acid, 255. Hexyl iodide, secondary, preparation of, from mannitol, 1113. Hexylene from mannitol, 1113. - chlorhydrin, 1114. Hippuric acid, 1144. --- formation of, in the animal organism, 928. Hippurylglycocine, 1144. Holmium, absorption-spectrum of, 349. Homatropine, 420. Homocinchonidine and its salts, 291. methyl derivatives of, 184. — phenyl sulphate, neutral, 292. — platinochloride, 922. Homohydroxysalicylic acid and its salts, Homo-itaconic acid, 801. and its salts, 1127. Honey, 316. Honig-thee, 441. Hopeite, 366. Hops, bitter principle and resin of, 101. — cultivation of, 931. —— of Southern Europe, 483. —— valuation of, 946. Hornblende, 698. Hospitals during yellow fever, air of, Hot spring at Nabmoo, near Maulmain, British Burmah, 1019. - of the littoral chain of Venezuela, 563. Humus extracted from soil by alkalis, 839. Hyalomelane, 701. Hydrangea arborescens, 916. Hydranthrone, nitroso-, 99. Hydratropic acid, brom-, 428. ---- chloro-, 277. · ---- chlor-, and brom-, 425. Hydrazincinnamic anhydride, 598. Hydrazobenzenetetrasulphonic acid, and its salts, 903. Hydrazo-compounds, molecular changes which they undergo when subjected to the action of mineral acids, 907. Hydrazo-diphenyl, 175. Hydriodic acid, action of molybdenum

- action of phosphorus on,

Hydrobromic acid, action of phosphorus on, 222. — — etherification of, 32. - mew compounds of, with ammonia, 972. preparation of, 18. Hydrocarbon,  $C_{10}H_{16}$ , 738. - C<sub>11</sub>H<sub>16</sub>, occurrence of, in rosin oil, 809. - from the Waratah mine, New South Wales, 982. new, from Seguoia gigantea, Hydrocarbons, aromatic, introduction of, into ketonic and aldehydic acids, 814, - aromatic, oxidation of, in the animal organism, 632. —— from American petroleum, 159. — obtained as bye-products in the decomposition of levulic acid by hydriodic acid, 399. of the acetylene series, direct addition of water to, 883. - pyrogenic, heat of formation of, unsaturated, action of oxygen on the bromo-derivatives of, 142. Hydrocarbostyril, 274. – parabrom-, 274. Hydrochlorapo-bases from cinchona alkaloïds, action of acetic anhydride on, 619. Hydrochloric acid gas, preparation of, 138.Hydrocinchonidine, 830. Hydrocinchonine  $\mathbf{of}$ Caventou and Willm, and its salts, 620. Hydrocinnamic acid, dinitro-, and its derivatives, 274. — metamidoparabromo-, 274. — orthonitro-, 274. — parabromometanitro-, 274.
— parabromorthonitro-, 274. Hydrocollidine and its salts, 825. Hydrocornicularic acid and its salts, Hydrocyanbenzide, 820. Hydrocyancarbodiphenylimide, 163. Hydrocyanic acid, detection of, 1175. Hydrofluoric acid, molecular weight of, 973. Hydrogen, liquid, density of, in presence of inert liquids, 874. — note on the spectrum of, 956.
— refractive equivalent of, in organic compounds, 958. relative intensity of the spectral lines of: its bearing on the constitu-

tion of nebulæ, 69.

VOL. XL.

— spectrum of the flame of, 957.

lines, widening of, 955.

Hydrogen peroxide, 474. - production of, by hydrogenised palladium, 898. — stability of, 16. persulphide, heat of formation of, 492. selenide, preparation of, 18. Hydromethylketole, 735. – nitroso-, 735. Hydropiperic acid, reactions of the ammonium salt of, 728. Hydrosantonic acid, action of phosphorus tribromide on, 286. Hydrostrychnine, trichlorinated, 293. Hydrothiodiphenylhydantoin, 906. Hydrotropine iodide, 263. Hydroxyanthranol, 823. Hydroxybenzamide, 42. Hydroxybenzophenone, trihydric, 592. α-Hydroxybutylformamide, 86. a-Hydroxybutylformic acid and its salts, a-Hydroxybutyric acid, 577. --- amido-acids of, 87. Hydroxycaffeine, 614. -- dibromo-, 614. Hydroxycinchomeronic acid, 744. a-Hydroxycinchonic acid and its salts, 743.Hydroxycumic acid and some of its salts, 276. Hydroxydiphenyl, dipara-, 605. Hydroxyethyluvitic acid, 431. Hydroxyisobutylacetic acids, 577. γ-Hydroxyisophthalic acid, 50. Hydroxyisovaleronitril, 85. Hydroxyl group, introduction of, by direct oxidation, 45. derivatives, Hydroxylamine vapourdensity determinations of a few, 571. - platinocyanide, 707. Hydroxylphthalamic acid, 586. Hydroxymesitylenic acid from xylenol, 599. Hydro-oxycamphoronic acid, 438. Hydroxyphthalic acid, 599. Hydroxypicoline, 1046. Hydroxypropylsulphobenzoic acid, 46. Hydroxyquinoline, 613, 743. Hydroxysalicylic acid and its salts, a, 1140.Hydroxysalicylsulphonic acid and its salts, 1141. Hydroxystilbene, ortho-, 1150. Hydroxytetrolic acid, 256. Hydroxythymoguinone, 596. Hydroxytoluic acid, 599. Hydroxytoluyl tropeine, 420. Hydroxytrimesic acid, 432. Hydroxyuvitic acid and its salts, 431. a-Hydroxyuvitic acid, preparation of, 172.

Hydroxyuvitic acids, comparison of properties of, 172.

Hydroxyvaleric acid, conversion of, into isopropylacetic acid, 414.

Hyoscine, 56, 446.

Hyoscyine, 57.

Hypargyrite, 362. Hypersthene, 549.

- from Bodenmais, 539.

- from the pumice of Santorin, 388. Hypersthene-andesite, so-called, from

St. Egidi in Lower Styria, 695. Hypocaffeine, 614.

Hypochloronitric anhydride, Gay-Lussac's, 506.

Hyposulphurous acid, 976.

### T.

Ice, analysis of, 207.

supposed heating of, 778.
and other bodies, existence of, in the solid state at temperatures far above their ordinary melting points, 966.

Ictrogen, 934.

Idocrase from Gleinitz and the Johnsberg, near Jordansmühl, 381.

Idryl and its derivatives (Part II), 283.

— tribrom-, 283. — trichlor-, 283.

Idryldisulphonic acid and its salts, 284. Idrylmonocarboxylic acid, 284.

Illicium religiosum, fruit and seeds of, 918.

Ilmenite from the Kapruner-Thörl in the Pinzgau, 996.

Incineration, note on, 939.

Indigo, preparation of skatole from,

278. quantitative estimation of, 310.

of sodium hyposulphite (Na<sub>2</sub>SO<sub>2</sub>) in the estimation of, 310.

- group, relation of cinnamic acid to, 274. Indigotin, Baeyer's process for the

synthesis of, 98.

Indoline and its derivatives, 51.

Infusorial earth, 545.

Ink, composition of, 67.

Inorganic compounds, relation between the molecular properties of, and their action on living animal organisms, 629.

Inosite, action of nitric acid on, 1022. - and its action on Fehling's solu-

Intestine, small, hydrolytic action of,

Inulin, 243.

Inulins, specific identity of, and of natural levulins, 149.

Invert-sugar, specific rotatory power of, 653, 654.

Iodides, alkaline, action of lead peroxide on, 976.

double thermic properties of some, 217.

Iodine, detection of, by platinum chloride, 644.

detection of, in urine, 644.

- gaseous, specific heat of, 784. - manufacture of, 207.

 behaviour of, at high temperatures, 686.

- vapour-density of, 221.

polymeric transformation of, 1096.

 $\beta$ -Todolactic acid, and some of its salts,

Iodometric process, further remarks on, 307.

 $\beta$ -Iodonaphthalene, 736.

Iridio-platinum alloy, 680.

Iron borocitrates, 89.

- chlorides, heat of solution of, 964.

- deposition of copper on, in a magnetic field, 962.

-- estimation of chromium in, 646. estimation of phosphorus in, 465.

finely divided, conduct of towards nitrogen, 1104.

— lines widened in solar spots, 957. - manufactured, estimation of basic

cinder and oxides in, 648.

- native, of Greenland, 515.

- ores, estimation of phosphorus in, 465.

— -ore, clay band-, or limonite, analyses of, 993.

- - ores from Canada, 546.

- reduction of, by powdered zinc, 1170.

- oxalates and some of their double salts, 713.

 oxide, magnetic, heat of formation of, 219.

oxides, 74.

— passive state of, 343, 872.

- pyrophoric, 74.

- quantitative estimation of phosphorus and silicon in, 194.

- removal of, from newly-broken soils, 638.

- rusting of, 512.

 separation of aluminium from, 1081.

- - method suggested for, 645.

separation of cobalt and nickel from, 1171.

Iron, separation of, from manganese and alumina, 1082.

- tungsten from, 1171.

- spectrum of, in the sun, 669.

titration of, with sodium thiosulphate, 849.

Iron-amalgam, preparation of, 879.

 phosphato-sulphate (diadochite), two varieties of, found in the coal mine at Peychagrard (Isère), 999.

 phosphide, crystallised, production of, by the fires in the coal beds at

Commentry, 690.

Iron and copper, crystals of a compound of, with sulphur, from Röras, 353.

Iron-glance from Biancavilla, 237.

Iron-manganese (spiegeleisen), crystalline form of, 789.

Iron-meteorite from Rittersgrün, examination of, 560.

Iron-pyrites, mineralogical examination of, 523.

Irrigation, action of water in the process of, 638.

- with sewage, 842.

Isatin, action of ammonia on, 434.

 preparation of, from orthonitropropiolic acid, 275.

Isatronic acid and its salts, 427.

Isatropic acids,  $\alpha$ - and  $\beta$ -, and their salts,

Isethionic acid, 581.

Island of Futuna, communications on,

Isoallylenetetracarboxylic acid, 156.

Isobutaldehyde, action of ammonia on, 84. action of phosphorus pentachloride on, 709.

ammonic compound, action of hydrogen cyanide on, 84.

- from light resin oil, 101.

— some derivatives of, 84.

Isobutyl alcohol, etherification of, 884. - isobutyrate, action of bromine on, **24**8.

- santonate, 181.

Isobutylacetal, 34.

Isobutylal, preparation of, 711.

Isobutylallylmalonic acid, 415.

Isobutylanthracene, 737.

Isobutylene, 400.

— monochlor-, 709. — dichloride, 710.

Isobutylformic acid, a-amido- (a-amidoisovaleric acid), 85.

and methylcrotonic acids, calcium double salt of, 1126.

Isobutylhydroanthranol, 737.

Isobutylidene, chlor-, 793.

--- action of hypochlorous acid on, 793.

— chloride, action of ammonia on, 793.

Isobutyltartronic acid, 577.

Isocaproic acid, oxidation of, 34.

Isocumic acid, 582.

– aldehyde, 582.

Isocymenesulphonic acid, oxidation of,

Isodibutylene, action of nitric acid ou,

Isodiethyloxamide, 717.

Isodimorphism of arsenious and antimonious oxides, 791.

Isodiphenylbenzene, 435.

Isodipyridine, 826.

Isoferulic acid, 740.

Isohexolic acid, 255.

Isohydroxyvaleric acid, amido-acids derived from, 713.

Isomeric bodies, specific refraction and dispersion of, 213.

Isomerism in the pyridine and quinoline series, 744.

- influence of, on the etherification of alcohols and acids, 883.

- of alcohols, influence of, on the formation of ethereal salts, 36.

- researches on, benzene and dipropargyl, 719.

Isophthalic acid, some derivatives of, 96. - sulphinide and its salts, 1038.

a- and γ-Isophthalosulphonic acid, 50. Isopropyl bromide, conversion of normal into, by heat, 567.

- iodide, action of triethylamine on, 1025.

Isopropylacetic acid, conversion of hydroxyvaleric acid into, 414.

Isopropylene-neurine, 151.

Isopropylenic glycol, heat of combustion

Isopropylphosphordichloride, 159.

Isopropylstilbene, 1150.

Isopyr, 990.

Isovaleramide, amido-, hydrochloride of,

Isovaleric acid, α amido- (α-amidoisobutylformic acid), 85.

Isovaleronitril, imido-, 85.

- amido-, hydrochloride of, 84. imido-, hydrochloride of, 85.

Isovanillic acid, 740.

Itaconic acid, 800. —— derivatives of, 1032.

— anhydride, 35, **15**5.

--- chloride, 1032.

Ivy, glucoside from, 440.

J.

Jadeite, blue sodalite, 990. Jamesonite, 548.

Jamesonite, from the province of Huelva, 1111.

Jaulingite, 539.

Jerusalem artichoke plant, influence exerted on the growth of, by allowing the "sets" to decay before planting, 456.

### K.

Kainite, injurious effect of, on the germination of potatoes, 300.

Kanizer or Kainzen spring, analysis of, 30.

Kaolin, 545.

----- sodio-aluminic silicates formed by the action of sodium carbonate on, 684.

Kelp, extraction of potassium iodide from, 319.

Kentrolite, a new mineral species from Chili, 554.

Kerosine mineral or torbanite, inorganic constituents of, 988.

Ketines, 796, 895. Ketone derivatives and aldehydammonia,

condensation products from, 1028. Ketones, nitroso-, reduction of, with sodium-amalgam, 796.

- oxidation of, 423.

Ketonic acids, aromatic, formation of, 600.

— introduction of aromatic hydrocarbons into, 814, 1035.
— synthesis of, 731.

Kidney substance, quantitative analysis of the albuminoïds of, 661.

Killinite, 1006.

Kinzigites of Calabria, 519.

Kitchen gardens, rotation of crops in, 1069.

Kjerulfin, 366.

- composition of, 230.

Klipsteinite, 990.

Kôji, 1059.

Kraurite, 527.

Kynuric acid and its salts, 827. Kynurine and its derivatives, 828.

# L.

Laboratory observations, 644.
Labradorite, analysis of, 537.
— from Dürrmosbach, 386.
— porphyries of Westphalia, 387.
Lactic acid in milk, 944.

Lactic acid,  $\beta$ -iodo-, and some of its salts,

--- isomerides of, 413.

—— monochloro-, and its salts, 417.

— prevention of the occurrence of, in beer, 857.

--- fermentation in urine, 928.

— acids,  $\alpha$ - and  $\beta$ -chloro-, formation of, 154.

Lactobutyrometer, milk-testing with, 657.

Lactonic acid, oxidation of, by silver oxide, 243.

— preparation of, 243.

Lactones, constitution of, 34.

Lactose, oxidation of, by silver oxide, 243.

specific rotatory power of, 150.and arabinose, identity of, 243.

Lævulan, a new species of gum occurring in beetroot molasses, 888. Lake mud as manure, 1077.

Lakes, saline, existence of boric acid in, 1019.

Lambs, duration and composition of the increase in live weight of, when fattening, 450.

Lapislazuli, a crystal of, 990.

Lavas from Hawaii and other islands of the Pacific Ocean, 392.

— from the Island of Niuafou, 701.
— from the neighbourhood of Cata-

nia, and their analyses, 701.

— of Georgio in Santorin, 557.

Lazulite, 545.

Lead chloride, action of chlorine and hydrochloric acid on, 788.

---- chlorobromide, 789.

detection of, in potable waters, 1173.

—— formate-acetate, 86.

—— furnaces, Freiberg, 208.

—— glycerides, 145.

iodide, coefficients of expansion of, 495, 966.

— ores, poor, removal of earthy matters from, by means of an airblast, 767.

---- oxycyanides, 1116.

---- plumbothioglycollate, 800.

quick method for the estimation of,

— raw, Schnabel's process of desilvering, 768.

— separation of silver from, 760.

silver iodide, expansion coefficients of, 966.

Leather, preparation of, 859. Lecture experiments, 18, 133. Legumin, action of barium hydrate on, 449.

- action of salt solutions on, 1160. Leguminosæ, cultivation and manuring of, 938.

Lemon oil, commercial, 437.

- trees, comparison of diseased and sound, 300.

Lepidine and its salts, 109.

bases isomeric with, 919.

Lepidophæite, 362.

Leptandra, resin of, 103.

Leptomeria acida (Australian current), acids of, 1033.

Leucaurin, 900.

Leuceïne, 1047.

Leucine from valeraldehyde, 796.

Leucite, 363.

crystalline form of, 397.

potassio-ferric silicate analogous to,

Leucoline, oxidation of, 1044.

— of tar, 1043.

Leucolinic acid, 1043.

decomposition of, 1044.

Leucomethylaurin, 901.

Leucopetrite, 359.

Levulic acid, conversion of, into normal valeric acid, 411.

--- formation of, from dextrose, 410.

formation of, from milk-

sugar, 410.

 — hydrocarbons obtained as byeproducts in the decomposition of, by hydriodic acid, 399.

— oxidation of, 411.

- preparation, properties, and salts of, 409.

Levulin, natural, preparation of, 149. Levulins, natural, specific identity of inulins and of, 149.

Leyden jars, reduction of observations on, 963.

Libethenite, 368.

---- artificial, 367.

Lichen esculentus (manna), analysis of,

Liebig's extract of meat, paralactic acid in, 413.

Light, influence of, on chemical action in animals, 833.

- on the germination of seeds, 1061.

on the growth of beet,

- --- on the liberation of carbonic anhydride by plants, 1060.

 on the ripening of grapes 930.

- intermittent, influence of, on the formation of chlorophyll, 930.

Light, white and coloured, experimental estimation of the velocity of, 861.

Lignin, 1122.

Ligno-ceric acid, and its salts, 249. - chloride, 250.

Ligroin, explosion of, 1181.

Lime, importance of, to the animal organism, 190.

Limestone, Silurian, analysis of, 698.

Limestones, phosphoritic, of the Island of Bonaire, West Indies, 391.

Limonite or clay-band iron-ore, analyses of, 993.

concretions, analysis of, 993.

Linaloes, essence of, 738.

Linseed, chemical composition of, 116, 753.

— cake, examination of, 636.

— meal, examination of, 636.

— oil, adulterated, 473. Liquid compounds, volume constitution of, 220.

- diffusion and osmose, electric currents caused by, 963.

state, limit of, 971.

Liquids, application of photometry to the study of diffusion phenomena in,

— dielectric capacity of, 963.

- influence of voltaic currents on the diffusion of, 963.

---- mixed, vapour-tension of, 1093.

- volume constitution of, 13.

Lithiophilite, 530. Lithiophorite (cacochlor), 363.

Lithium, spectrum of, 957.

borocitrates, 89.

- hydroxylamine platinocyanide, 708.

—— oxide, specific gravity of, 220.

— uranate, 686.

Liver, amount of glycogen in, after death, 628.

- does injection of sodium carbonate into the portal vein cause the disappearance of glycogen from? 627.

 formation of glycogen in, 626. - influence of cold on the amount of

glycogen in, 627.

- influence of severe bodily exercise on the amount of glycogen in, 626.

- nature of the sugar found in, after rigor mortis, 628.

Livers of hybernating animals, glycogen

Livingstonite, altered, from Guadal-cazar, S. Luis, Potosi, Mexico, examination of, 517.

artificial production of, 518.

- from a new Mexican locality, examination of, 517.

Logwood, detection of, in wine, 761.

Lophine, 51, 591.

- hydrobromide, action of bromine

Lubricating oil, explosion of, 1181.

Lucerne and darnel, as a mixture for meadows, 1065.

Lunnite group, 368.

Lupine sickness, prevention of, 934. Lupines, purification and digestibility of,

---- use of, as fodder, 116.

— yellow, growth of, 299.

- and field beans, comparison of the influence of, on the production of milk, 927.

Lupinine, 831.

Lupulic acid, 102.

Lupulin, composition of, 102.

Lapuliretin, 102.

Luteo-cobaltamine chlorides, 1106.

Lutidine, 56.

oxidation of, 443, 612.

 $----\beta$ -, physiological action of, 1058.

—— aurochloride, 288.

hydrochloride, 56.

Lutter, manuring experiments at, 935. Lycopodine, 1158.

### M.

Macrocarpin, 52.

Magnesia, production of, 1180.

- industry, 1087, 1180.

Magnesium, gases occluded in, 350.

— borocitrates, 89.

--- carbonate, comparative examination of samples of, 208.

solubility of, in water charged

with carbonic acid, 1102.

— potassium platinocyanide, 240.
— rate of solution of, in different

acids, 344.

 salts, alkanet red a test for, - vegetable colouring matters

as test for, 63. — spectrum of, 955, 957.

Magnetic oxide of iron, heat of formation of, 219.

Magnetite, 994.

Maize, cultivation of, 455.

---- stripping, 837.

— use of, in the preparation of starch, sugar, spirit, and beer, 330.

Malachite-green and its salts, 165.

 preparation and salts of, 589.

Maleic acid, amido-, 254.

— formula of, 254.
— halogen derivatives of, 416.

Maleic acid and its salts, rotatory power of, 892.

- influence of sulphuric and of acetic acids on the specific rotatory power of, 893.

Malonic acid, action of bromine on,

- occurrence of, in the manufacture of beet-sugar, 800.

Malt, influence of, on the quality and keeping properties of beer, 1090.

- influence of temperature on the composition and amount of extract obtained from, 951.

Malt liquors, influence of, on digestion,

Malt wort, decrease of nitrogen in, during fermentation, 331.

Malto-dextrin, 1024.

Maltose, 567, 568.

oxidation of, 568.

Mandelic acid, preparation of, from benzaldehyde, 277.

Manganese in steel, 950.

occurrence of, in Nordmark, 697.

- carbonate (mineral), 698.

--- dioxide, action of hydrochloric acid on, 22.

— containing antimony, 141.

- ores, Canadian, 546.

**----** 76, 789. — separation of iron from, 1082.

— sulphochromite, 226.

- volumetric estimation of, in presence of ferric oxide and alumina,

- volumetric estimation of, method suggested for, 645.

- calcium carbonate containing barium, from Laangban, 690.

Manganidocrase, 381.

Manganite, crystal system of, 364.

Manganosite, 697.

Manganous chloride, action of chlorine

- -- and hydrochloric acid, action of chlorine on, 23.

Manganspath (rhodochrosite), 531.

Mangold wurzel, manuring experiments with, 61.

Manna (Lichen esculentus), analysis of,

Mannitol, hexylene from, 1113.

— nitro-, heat of formation of, 969.

Manure, analyses of, 640.

— for fruit trees, 121.

— from molasses waste, preparation of, 937.

gypsum as, 1076.

lake mud and marsh earth as, 1077.

— potash salts as, 1072.

- Manure, stable, researches on the changes occurring in, when kept, 937. use of ammonium citrate in examination of phosphates in, 846. - use of potassium salts as, 839, 840. - wool waste as, 937. Manure heaps, testing the progress of putrefaction in, 937. Manure materials, solubility of, 120. Manures, artificial, 304. — experiments with, 641. — potassium salts as, 459. Manuring experiments, comparative, 1079. — on arable land, 61.
  — on "Donaumoos," 935.
  — to determine the value of phosphoric acid soluble in "citrate" solution, 1075. - - with phosphoric acid in dif
  - ferent combinations, 1167, 1072. Margarine, a substitution for butter and lard, 209.

- analysis of, 210.

Margarite, 234.

Marsh earth as manure, 1077.

Masonite, 234.

Mass, volumetric determination of the chemical influence of. Part III. On the mass-influence of water, 497.

Maté, effect of, on the gases in the blood,

Material, strained, reduction of observations on, 963.

Matter, fourth state of, 971.

Meadows, lucerne and darnel as a mixture for, 1065.

Meals, presence of corn-cockle seeds in,

Measure made of a 10 per cent. iridium platinum alloy, 680.

Meat, changes undergone by, in the process of pickling, 66.

Meat-peptones, preparation of, 449. Meconic acid, 418.

- double salts of, 418.

Melanchlore, 550.

Melanophlogite, 1000.

Melanterite trom Idria, 232.

Melaphyr, augitic, 27.

from the neighbourhood of Kleinschmalkalden, 27.

Mellic acid, electrolysis of, 798.

Mellitic acid, synthesis of, 40.

Menaccanite, 994.

Mercuric chloride, compounds of hydrochloric acid with, 355.

- oxide, action of sodium on, 348.

Mercurous chloride, solubility of, in hydrochloric acid, 881.

Mercury, action of oxygen on, at the ordinary temperature, 1107.

 action of oxygen on, in eudiometrical experiments, 782.

- American sulpho-selenides 361.

 occurrence of,  $_{
m in}$ California, 689.

- preparation of, at the "Stefansfoundry in the Zips," 768.

- and other metals, spontaneous oxidation of, 791.

cyanide, decomposition of, 794.

 fulminate, explosive properties of, 779.

- fulminate, heat of formation of, 780.

— oxycyanides, 1116.

- salt, crystalline, analysis of, 355.

— selenates, new, 1099.

Mesaconic acid, 416.

derivatives of, 1032.

---- chloride, 1032. Mesadibromopyrotartaric acid, decom-

position of, 416.

Mesitonic acid, 796. Mesitylene, sulphamine- and hydroxy-

acids derived from, 429. Mesitylenedisulphonic acid and its salts,

Mesitylene-sulphonamide, oxidation of,

- structure of the oxidationproducts of, 822.

Mesitylenic sulphinide and its salts,

Mesolites, 1007, 1008.

Mesoxalic acid, decomposition of, 415.

Metacaseïn, 1053.

Metachloral, transformation of chloral into, 248.

Metacroleïn, 406, 888.

Metahæmoglobin, 185.

Metahomoparahydroxybenzoic acid, 599. Metal, changes of volume accompanying electrolytic deposition of a, 671.

Metallic chlorides, action of hydrochloric acid on, 223, 347, 785.

— hydrochlorides of, 877.
— reduction of, by hydrogen, 877.

- oxides of the iron group, 74.

- solutions, action of sulphur on some, 1097.

Metalloïds, union of, by pressure, 499.

Metallurgy, novelties in, 768.

Metals, action of mineral waters on, 238.

— mitric acid on, 876. — oils on, 772.

- chemico-electric relations of, on solutions of potassium salts, 962.

Metals, enamelling, 208.

- some, changes in volume of, on fusion, 783.

- union of, by pressure, 499.

Metamerism in certain compounds, two remarkable cases of, 88.

Metamethylbenzaldehyde, 582.

Metamorphoses of nephelin rocks. 1013.

Metanitraniline silver nitrate, 1130.

Metarabin (?), 443.

Metasantonin, 285.

- monobromo- and di-, 285, 286.

Metatoluidine, preparation of, 721.

Metaxylene, paranitro-, 49.

Metaxylenesulphonic acid, nitro-, and its salts, 49.

Metazotolucne, 432.

Meteoric dust containing a large quantity of metallic iron, which fell at Catania on the night of March 29, 1880, 561.

- iron at Sainte-Catherine, anoma-

lous magnetism of, 704.

-- from Cohahnila, nodules of chromite in, 705.

- — from Ivanpah, California, 394.

--- new, from North Carolina, 1017. - of unknown locality, in the

Smithsonian Museum, 1111.

— mineral, a new, 29.

 nickel-iron, synthetic imitation of, 1018.

Meteorite from Cleborne Co., Alabama, U.S., 394.

— iron-, from Rittersgrün, examination of, 560.

- which fell at Estherville, Emmet Co., Iowa, in May, 1879, 395, 561.

- which fell on the 15th of October, 1872, in the neighbourhood of Soko-Banja in Servia, lithological and geological examination of, 1017.

which fell on the 26th of November, 1874, at Kerilis, commune of Maël-Pestivien, Canton de Callac, 1017.

- fall of, at Gnadenfrei, in Silesia, May 17th, 1879, 237, 395.

natural, mode of formation of, 1018.

Methacrylic acid, bromo-, action of potash on, 413.

----- isobromo-, 416.

Methane, carbonate, trichloro-, 251. chlorine and bromine derivatives of, 238.

Methenylamidotoluenemercaptan, 597. Methoxyethoxy-hydroxycaffeine, 614.

 $\beta$ -Methoxyglutaric acid and its silver salt, 404.

- formation of, from diallylmethylcarbinol, 414.

Methoxynitrotoluic acid, 269.

Methyl acetylpulvate, 97.

acrylate, polymerides of, 250.

 alcohol, detection of, in ethyl alcohol, 197.

- --- use of, in preparing colouring matters, 211.

— carbonate, 251.

- ether, heat of solution of, 8.

--- ethyl carbonate, 88. — hesperitate, 740.

--- iodide, hydrate of, 32.

—— iodoacetate, action of methyl iodide on, 576.

—  $\alpha$ - and  $\beta$ -naphthyl ether, and nitration of, 724.

— paramethoxysalicylate, 271.

- sulphate, action of ammonia and amines on, 240.

Methylal, thermal constants of, 675.

Methylamidobutyric acid, 87.

Methylamine, action of methyl nitrate, bromide, and iodide on, 1027.

 in commercial trimethylamine hydrochloride, 83.

- occurrence and origin of, in urine, 631.

- methylsulphate, 241.

- phthalate, action of phosphorus pentachloride on, 285.

Methylamines, production of, 1026.

Methylamylaniline, 584.

Methylaniline methylsulphate, 241. Methylarbutin, 610.

Methylated spirit, assay of wood spirit for the preparation of, 1174.

- wood spirit, for making, 942. Methylatrolactic acid, 1036. Methylaurin, 900.

- action of ammonia on, 725.

Methyl benzophosphinate, 604. Methylbutylbenzene, 809.

Methylcarbamide, occurrence and origin of, in urine, 631.

Methylcinchonine, 289.

- dimethiodide, 289.

Methylconine, synthesis of, 825.

Methylcrotonic acid hydriodo-, action of zinc and sulphuric acid on, 1126.

- and isobutylformic acids, calcium double salt of, 1126.

Methyldeoxybenzoïn, 1034.

Methyldibromatrolactic acid, 1036.

Methylene chloride, thermal constants of, 674.

Methylenecaffeic acid and its derivatives,

Methylenedioxyphenylacrylic acid and its derivatives, 48.

Methylenedioxyphenylamidacetic acid and its salts, 729.

Methylenedioxyphenylamylic acid, reactions of the ammonium salt of, 728.

Methylenedioxyphenylangelic acid, 727. Methylenedioxyphenylglycollic acid, 729.

Methylenedioxyphenylisobutyric acid, 49.

Methylenedioxyphenylmethacrylic acid, 49.

Methylenedioxyphenylpropionic acid, 49.

Methylenedioxyphenylvaleric acid, reactions of the ammonium salts of, 728. Methylene-diphenyl oxide, 264.

Methylene-a-homocaffeic acid and its derivatives, 48.

Methylene-α-homohydro-caffeic acid, 49.

Methylenehydrocaffeic acid, 49.

Methylenephthalyl, 733.

β-Methylethenyltricarboxylic acid, 579. Methylethylamylammonium hydroxide,

action of heat on, 571.

Methylethylamylphenylammonium hydroxide, action of heat on, 571.

Methylethylurea, 88.

Methylhexylketone, 794.

Methyl-homo-cinchonidine and its derivatives, 184.

Methylisopropyl carbino!, 401.

Methylketole and its derivatives, 734.

Methyl mono- and di- nitro-quinol,

Methyl mono- and di- nitro-quinol, 1139.

β-Methylmorphine and its hydrochloride, 1154.

Methylnaplithalene, 436.

Methyluitroquinone, 583.

Methyloxanthranol, derivatives of, 608. Methylparabanic acid from dimethyluric acid, 39.

Methylparatoluidine methylsulphate, 241.

Methylphenyl ketone, 279.

Methylpiperidine, 621.

Methylpropylacetic acid, calcium and barium salts of, 408.

β-Methylpropylethylenelactic acid and its salts, 402.

Methylpulvic acid, 97.

Methylpyridine-carboxylic acid, 611.

Methylpyridinedicarboxylic acid, 110. Methylpyridyl iodide, action of silver oxide or potassium hydroxide on,

921. Methylpyridylammonium iodide, action of sodium-amalgam on, 921. Methylpyrroline, action of chloroform on, 827.

Methylquinone, 619.

--- methiodide, 619.

Methylquinolinic acid, 611. Methylresorcinoldialdehyde,  $\alpha$ - and  $\beta$ -,

Methylresorcinol, tribromo-, 270.

Methylstilbene, 1035.

Methyltartronic acid, 254.

Methylthioparabanic acid, synthesis of, 896.

Methyltribenzylammonium methylsulphate, 241.

Mica, a new, 385.

- from Striegau in Silesia, 549.

— mineralogical examination of, 524.
— more especially zinnwaldite, note

on, 692.

Microscopi grains of in the atmosph

Micrococci, grains of, in the atmosphere, 645.

Microlite from Amelia Co., Virginia, 1002.

Microscopic animals, destruction of, in potable water, 1179.

Microzyma cretæ, non-existence of, 835.

Milk, 953.

---- acidity of, 473.

— action of rennet on, 953.

—— albuminoïds in, 449.

- alcoholic fermentation of, 944.

—— analyses of, 1176.

—— analysis, 657, 1184.

— apparatus for skimming, 129.

—— araometric method for the estimation of fat in, 656.

----- blue, 1055.

---- blueing of, 953.

comparison of the influence of field beans and lupines on the production of, 927.

composition of, from the same cow on consecutive days, 762.

—— condensed, analysis of, 658.

creaming of, by surface cooling, 857.

----- creaming of, in earthen pans, 771.
----- estimation of fat in, 656, 851, 1184.

estimation of salicylic acid in, 1185.

- examination of, 946.

—— human, composition of, 630.

- lactic acid in, 944.

of Tyrolese cows, 1163.

quantity and quality of, yielded by different races of cows, 630.

Milk-peptone, preparation of, 450.

Milk-sugar, a hitherto unobserved property of, 151.

- anhydrous, 151.

Milk-testing with the lactobutyrometer,

Mimetesite or mimetite, 1109.

Mineral containing selenium, analysis of,

Va., analysis of, 554.

— green chloritic, 530.

- of the augite group, metamorphosis of, 996.

· resembling thorite, analysis of, 1009.

---- analyses, 698.

--- analysis, a solution of density 3.28 suitable for, 1168.

- enclosures in the basalt of the Persanyer Gebirge, 703.

— localities in North Carolina, 1109.

- locality, new and remarkable, in Fairfield, Connecticut, 529.

— oils, heavy, analysis of, 202.

- species, two new, from the mineral locality of Fairfield Co., Connecticut, 229.

- spring, Grosslüder, at Salzschlirf, chemical examination of, 29.

- Kanizer or Kainzen, analysis of, 30.

 water of Niederbronn in Unter-Elsass, analysis of, 80.

waters, action of, on metals, 238.

 of Rouen and Forges-les-Eaux, amount of iron in, 397.

- - saline, law of the formation of, 1018.

Mineralogical notes, No. V, occurrence of manganese in Nordmark, 697. - observations, 543.

Mineralogy, contributions to, 548.

- microscopical, miscellaneous contributions to, 990.

– of Russia, materials for, 523.

Minerals, action of organic acids on, 62, 642.

- Austrian, 544.

- bismuth, from Nordmark in Wermland, 688.

---- Canadian, **545**.

– from Chili, 551.

- from Hülmerkobel between Zwiesel and Bodenmais, 550.

Berg, near Devn in Transylvania, 548.

— from the iron mine of Morawicza in the Bannat, 996.

- from the mining district of Rodna, in Tranyslvania, 548.

Minerals from the Silberberg at Bodenmais in Bavaria, 549.

- from the veins of copper ore near Copiapo, in Chili, 551.

- from Zöptau and Schonberg in Moravia, 550.

miscellaneous, notes on, 542.

— New South Wales, 991.

 Norwegian, crystallographic examination of, 398.

- occurring in the mines of the counties of Dublin and Wicklow, 383.

 of some of the apatite-bearing veins of Ottawa Co., Quebec, 542.

- of the clay group, 540.

- of the Sarrabus mine, Sardinia,

- two new, from the Eleonora mine in the Dünsberg, near Giessen, 525.

- various Canadian, amounts of gold and silver in, 546.

Mispickel, FeSAs, from Pribram, 231. Mixite, 532.

Mogdad coffee, 483.

Molasses, recovery of cane-sugar from, by fermentation, 480.

separation of sugar from, 128.
waste, preparation of a manure from, 937.

Molecular grouping in organic bodies, influence of, on their absorption in the infra-red region of the spectrum, 487.

- heat and volume of the rare earths and their sulphates, 494.

- refractive power, alteration of, 862.

-rotatory power of carbon compounds, 215.

- volume of certain acetates, 969.

- weight, alteration of, 862.

- of organic compounds, relation of the specific heat to, 963. Molybdenum, new method for

volumetric estimation of, 1083.

Monazite, 991, 1109.

Monethyloxamide, action of phosphorus pentachloride on, 718.

Monobenzoylditolylhydrazine, 41.

Monomethylamine, action of methylbromide and methyl iodide on, 33.

Monomethylanthracene, 1129. Monomethylparabanic acid, 747.

Monomethylresoreenedialdehyde, a- and β-, 271.

Monomethylresorcinol, 270.

Mononaphthylamines from naphthols,

Mono-β-naphthylearbamide, 606.

Monophenyloxamide, action of phosphorus pentachloride on, 718.

Monoxyanthraquinone, preparation of,

Monoxydiphenylmethanecarboxylic acid, 96.

Monoxydiphenylphthaleïn, 96.

Monoxylphenylanthranol, 97.

Montmorillonite, 541.

Monzonite of Predrazzo, petrographical constitution of, 27.

Morphine and its congeners, some reactions of, 1044.

constitution and salts of, 921.

---- estimation of, in opium, 945.

ethereal derivatives of, 1045.

— methyl ether of, 1153.

– transformation of, into codeïne and homologous bases, 829.

Moss-gold, formation of, 687.

Moss-silver, formation of, 687.

Mottramite (?), 1108.

Mountain group of the Rummelsberg, near Strehlen, 698.

Mucobromic acid, 36.

 action of bromine on, 36. Multiple rotations, T. Thomsen's law of,

Muscle, action of ammonia and its salts,

and of hydrocyanic acid on, 1058.

- formation of glycogen in, 629. — serum albumin in, 630.

Muscles, amount of glycogen in, after death, 628.

Must, analyses of, 1092, 1182.

- treatment of, in the press house,

Mustard, black and white, analyses of,

oil, testing of, 125.

Mycoproteïn, 449.

Mydriatic alkaloïds, 446.

Myosin, vegetable, 1062.

#### N.

Naphthalene, action of amyl chloroxalate on, 731.

-  $\beta$ -derivatives of, 736.

--- derivatives, 822.

— dichloro-, 915.

-  $\alpha$ - and  $\beta$ -dinitro-, oxidation of, by nitric acid, 435.

---- β-iodo-, 736.

pure, preparation of, 1151.

 and ethyl chloride, action of aluminium chloride on a mixture of, 1041. Naphthalenes, amidobenzamido-, 1132.

- nitrobenzamido-, 1132. Naphthanthraquinone and its halogen derivatives, 280.

Naphthaquinone, 1041.

a-Naphthaquinoneanilide, conversion of,  $\beta$ -naphthaguinoneanilide into, 1041.

B-Naphthaquinoneanilide, conversion of, into α-naphthaquinoneanilide, 1041.

a-Naphthoic acid, mononitro-, 822.

β-Naphthol, action of commercial trimethylamine on, 177.

- a- and  $\beta$ -, action of ethyl chlorocarbonate on, 48.

 action of oxalic and sulphuric acids on, 280.

---- β-amido-, 736.

– chloro-, 915. — derivatives of, 177.

--- β-, nitro-, 736.

— reactions of, 177.

 $\beta$ -Naphtholdisulphonic acids, 178.

 $\beta$ -Naphtholetherdisulphonic acid and its potassium salt, 914.

Naphtholetherphosphoric acid, chloro-, and potassium salt of, 914, 915.

β-Naplitholsulphonic acid, action of phosphorus pentachloride on, 914.

- nitroso-, 436.

β-Naphtholtetrazobenzene, and sulphonic acids of, 178.

Naphthonitril, 822.

- nitro-, 822.

α-Naphthoquinoline, 920.

β-Naphthoquinonanilide, and its salts,

Naphthoquinonechlorimide, 164.

 $\alpha$ -and  $\beta$ -Naphthyl ether, and  $\beta$ -, 264.  $\beta$ -Naphtlylacetonaphthalide, 606.

Naphthylacetylamine, 605.

 $\beta$ -Naphthylamidoethyl ether, 178. α-Naphthylamine platinocyanide, 708.

 $\beta$ -Naphthylamine, bromo-, 606.

- derivatives of, 605.

– nitrate, 736.

Naphthylamines, trinitro-, 724.

 $\beta$ -Naphthylanilidoethyl ether, 178.

 $\beta$ -Naphthylbromethyl ether, 177.

β-Naphthylcarbamide, mono-, 606.

Naphthylenephenyline oxides,  $\alpha$ - and  $\beta$ -, and derivatives of the a-compound, 282.

Naphthylphenylamine,  $\alpha$ - and  $\beta$ -, 176.

- β-di-para-bromo-, 177.

--- α-dinitro-, 176.

α-tribromo-, 176.

β-Naphthylthiocarbimide, 606.

mono- and di-, 606. β-Naphthylthiourethane, 606.

 $\beta$ -Naphthylurethane, 606.

Nartine, 445.

Natrolite, crystallographic examination of, 398.

 microscopical examination of the matrix of, 1014.

Nasal secretion, abnormal presence of uric acid in, 1161.

Nephelin rocks, metamorphoses of, 1013. Nephrite from New Zealand, 377.

Neriodorein, 916.

Neriodorin, 917.

Nerium odorum, 916.

Nerve, action of ammonia and its salts, and of hydrocyanic acid on, 1058.

Nessler's test for ammonia, use of, for the detection of carbonic acid in water, and of caustic alkalis in presence of carbonates, 940.

Newberyite, 231.

Nickel, qualitative separation of cobalt from, 194.

 separation of, from cobalt, 1082. - separation of, from iron, 1171.

---- oxides, 77.

Nickel-speiss (placodin), 228.

Nicotine, 288.

- action of selenium on, 825.

Nicotinic acid, 444.

Niobite, 550.

Nitranilines, preparation of, 1130.

Nitrates, estimation of, in potable and river waters, 1173.

- some, occurrence and estimation of, in vegetable substances, 122.

Nitric acid, dissociation of, by vegetation in the dark, 836.

 estimation of, and separation from nitrous acid, 1080.

Nitrification, 221.

Nitrils, action of nascent hydrogen on,

Nitrobenzene, action of chlorochromic acid on, 583.

Nitrobenzenes, substituted, action of sulphuric acid on, 91.

Nitrogen, apparatus for the collection of, in elementary analysis, 192.

- apparatus for the estimation of, in organic compounds, 192.

- apparatus for the volumetric estimation of, 62.

conduct of finely divided iron towards, 1104.

elimination of, from the animal body, 451.

- estimation of, in the different states in which it exists in vegetable products, 933.

- heat of formation of the oxides of,

- liquid, density of, in presence of inert liquids, 874.

- oxides, loss of, in the manufacture of sulphuric acid and a means of preventing it, 475.

- peroxide, action of, on carbon compounds, 584.

Nitrogen sulphide, action of chlorine on,

new derivative of, 222.

--- refractive equivalent of, in organic compounds, 958.

- relative intensity of the spectral lines of; its bearing on the constitu-

tion of nebulæ, 69. -and oxygen, new compound of, 221.

- and sulphur, some compounds of,

Nitroglycerol, estimation of, in dynamite, 472.

Nitrophenolsulphonic acid, introduction of bromine and iodine into, 93.

Nitrophenols, new, 47.

Nitroprussides, organic, 883.

- of the alkaloïds, 401.

Nitrotoluidine silver nitrate, 1130.

Nitrous acid, estimation of, and separation from nitric acid, 1080.

Nomenclature of some azo-compounds, 163.

Norwegian minerals, crystallographic examination of, 398.

- North Sea Expedition, results of, 81.

#### 0.

Oats, composition of, 116.

---- crushed, as fodder, 837.
---- cultivation of, 455.

- manuring experiments on, 1077.

- manuring, with saltpetre, 938. Octomethyltetramidotetraphenylethane and its salts, 160.

Œnoglucol, 272.

Ohm in absolute measure, determination of, 963.

Oils, action of, on metals, 772.

action of sulphuric acid recently heated to 320° on, 971.

- estimation of fatty acids in, 202.

- heavy mineral, resin, and fatty, analysis of, 202.

- new method of analysing, 1084.

- of the fruit and seeds of Illicium religiosum, 918.

- of commerce, analysis of resin in, 202.

Oil of wine, 794.

Oil-seeds, different, crystalline albuminoïds from, 833.

Olefines, nitro-, 1114.

Oleomargarine, 209.

Oligoclase, 549.

- from Dürrmosbach, 386. Olive oil, adulteration of, 945. Olivenite, 551.

Olivine, 698.

---- analysis of, 698.

--- crystallised slag isomorphous with, 1016.

Olivine-gabbro from Cornwall, 388.

Olonez earth, 358.

Onofrite, 361.

Ontariolite, 382.

Ophitic structure, artificial production of, 697.

Opium, estimation of morphine in, 945.

Optical constants, 214.

rotatory power of organic compounds, 1020.

multiples in, 257.

ples in, 147.

\_\_\_\_ of santonin-derivatives,

Optically active substances, inversion of the rotation of, 257.

Orcinol, action of ethyl chlorocarbonate on, 48.

--- dinitro-, 584.

ethers of, action of nitric acid on, 1139.

Orcinolcarboxylic acid (pseudorcellic acid), preparation of, 96.

Ore, complex, containing zinc, metallurgic treatment of, 668.

Ores containing sulphur, arsenic, and antimony, to obtain silver and gold from, 769.

especially bismuth-ores, from the district of Tazna in Bolivia, 548.

Organic acids, new method of brominating, 711.

bases containing oxygen, new synthesis of, 722.

— bodies, influence of the molecular groupings in, on their absorption in the infra-red region of the spectrum, 487.

--- phosphorescence of, 488.

—— compounds, chemical constitution of, in relation to their refractive power and density, 489.

— multiples in the rotator powers of, 403.

optical rotatory power of,

reactions of aluminium chloride and bromide with, 398.

--- matter, relations between, in various waters, 1087.

Organic substances, electrolysis, in aqueous solutions, 215.

Organised bodies, phosphorescence of, 488.

Orroproteïn, 449.

Orthoantimonious acid, 157.

Orthobenzoylbenzoic acid, 731.

96.

Orthoclase, 549.

---- from Frath, 550.

Orthocresyl-ethyl ether, and nitration of, 723.

--- ethylene ether, 723.

Orthoethylphenol and its derivatives, 268.

Orthohydrazincinnamic acid, 598.

Orthomethoxyparabenzaldehyde, 271. Orthomethoxyparahydroxybenzaldehyde, 271.

Orthomethoxyparahydroxybenzoic acid, 271.

Orthoparahydroxydiphenyl, 605.

Orthophenolsulphonic acid, conversion of, into the para-compound, 92.

Orthotoluidine, dinitro-, 724.

Orthotribenzoylbenzene, 733.

Orthoxylene, separation of, from its isomerides, and preparation of the xylidene, 433.

Osmose, electric, 963.

--- use of parchment-paper in, 952.

and liquid diffusion, electric currents caused by, 963.

Ottrelite, 234.

Oxalates, double and triple, containing chromium, 1031.

— - use of, in analysis, 843.

Oxalethylin, action of, on the animal system, 246.

chlor-, action of, on the animal system, 246.

Oxalic acid, decomposition of a solution of, by sunlight, 485.

Oxallyltriethylammonium salts, 1122.

Oxalmethyline, chlor-, and its salts, 572.

Oxalpropylene, and its salts, 572. Oxamides, substituted, 717.

Oxanthranol, 97.

— nitroso-, 607. Oxatolylic acid, 173.

Oxen, fattening of, 116.

Oxides, estimation of, in manufactured iron, 648.

— union of, by pressure, 500. Oxindol, paramido-, 731.

— chloride, paradiazonitroso-, 731.

Ox - tongues, tinned, analysis of, 212.

Oxanthraquinone, dinitro-, and its salts, 608.

Oxyanthraquinone, dinitro-, reduction of, 608.

Oxyclycopia-red, 443.

Oxyclycopin, 443.

Oxydiphenyl, isonitro-, 911.

Oxyechitamine (?), 448.

Oxyethyleneorthamidophenyl ether, 1138.

Oxyethylidenesuccinic acid, 254.

Oxygen absorption of alkaline pyrogallate, 307.

--- action of, on mercury in eudiometrical experiments, 782.

---- compressibility of, 782.

—— dissolved in water, use of sodium hyposulphite in the estimation of, 310.

---- explosion in preparing, 1097.

—— liquid, density of, in presence of inert liquids, 874.

refractive equivalent of, in organic compounds, 958.

and nitrogen, new compound of, 221.

— and organic matter, relations between, in various waters, 1087.

Oxylethylene, chlor-, 717.

Oxyquinone, 282.

Oxytetrolic acid and its homologues, 255.

Oysters, sewage in, 953.

Ozobenzene, 898.

Ozone, absorption-bands of, 221.

--- absorption spectrum of, 213.

—— action of, on germs contained in the air, 632.

- atmospheric, 345.

---- liquefaction of, and its colour in the gaseous state, 18.

— liquefaction of, in presence of carbonic anhydride; its colour in the liquid state, 786.

- preparation of, by heating substances containing oxygen, 221.

proofs of the existence of, in the

atmosphere, 20.

— specific magnetism of, 340. Ozonoscopic papers, action of carbonic anhydride on, 975.

#### P.

Pagodite, green, from Georgia, 382. Palembang benzo'in, 101. Palladium, action of, on coal - gas, 706. Palm-nut meal, analysis of, 301.

Palm-nut meal, analysis of, 301. Pancreas, hydrolytic action of, 114. Pancreatic diastase, estimation of 1051.

- extracts, comparative diastasic values of different, 1052.

and proteolytic activity of, 1051.

Papain, 58.

a new contribution to the history of soluble ferments, 750.

Para-anhydrodisulphaminebenzoic acid, 816.

Parabenzarsinic acid, 168.

Parabenzenesulphonic acid, bromorthamido-, and its salts, 174.

Parabromobenzene, nitrosomethylorthonitro-, 730.

Paracolumbite, 382.

Paraconine, 825.

Paracresol, dinitro-, 724.

ethyl ether, dinitro-, and reduction of, 725.

723.

Paradiethoxysalicylic aldehyde, and its nitro-compound, 167.

Paraditolylarsenious chloride, 904.

Paraditolylarsinic acid, 904.

Paraditolylhydrazine, 41.

Paraditolylnitrosamine, 41.

Paragluconic acid, 894. Paraffènes, 706.

Paraffin-derivatives, monhaloïd, from secondary and tertiary alcohols, action of triethylamine on, 1024.

Paraffin oil, residue from the manufacture of, from schists, 208.

Paraffins extracted from the lowest boiling portions of petroleum, action of alcoholic bromides, and of hexbromethane in presence of aluminium bromide on, 399.

Parahomometahydroxybenzoic acid, 599. Parahydroxydiphenyl, paranitro-, 911. Parahydroxyphenetol, 166.

Parahydroxyphenol, 166.

Para-ilmenite, 382.

Paramethoxysalicylaldehyde, 271. Paramethoxysalicylic acid, 271.

Paramethyldibenzyl, 1034.

Paraorsellic acid and its salts, 266.

Parasantonide, specific rotatory power of, 919.

Paratoluenesulphonacetic acid, 716.

Paratoluidine mucate, dry distillation of, 721.

---- platinocyanide, 708.

silver sulphate and nitrate, 1129, 1130.

Paratoluylorthobenzoic acid, and its salts, 731, 732.

Paratolylanilide, oxidation of, 95. Paratolylarsenious oxide, 904. Paratolyl-benzylcarbinol, 1035.

Paratolylxylidine, 94.

- mononitro-, 94.

Paraxylenes,  $\alpha$ - and  $\beta$ -dinitro-, crystallisation of, 808.

Paraxylenol, oxidation of the methyl ethyl of, 268.

Parazotoluene, 432.

Parchment-paper, use of, in osmose,

Particles, small, aggregation of, 970.

Parvoline, 56.

Paytine, 108.

supposed  $\mathbf{a}$ nd aspidospermine, identity of, 622.

Pease, decomposition of, in the intestine of man, 187.

Peat, composition of two samples of, 641.

Peat-tar, a new hydrocarbon from,

Pelletierine, homologue of, 1046.

Pentacetaesculin, dibrom-, 108.

Pentamethylbenzene, 40.

Pentamethylethol, 401.

Pentolic acid and its salts, 255.

Penwithite, a new Cornish mineral,

Peptones, estimation of, 947.

estimation of, in plants, 312.

—— preparation of, 449.

- and alkaloïds, 832.

Perchloric acid, specific heat and heat of dilution of, 1092.

Peridote, titaniferous, from Zermatt,

Periodic atomicity, history of, 138.

Pernitric acid, 222.

Perowskite, 398.

of Val Malenco, 1002.

Peroxides, volumetric estimation of, 843.

Persea Lingue and its tannin, chemical examination of, 600.

Peru balsam, testing of, 947.

Peruvian bark, alkaloïds of, 183.

Petalite, 694.

Petrocene, a product of the destructive distillation of petroleum, 1128.

Petroleum, American, hydrocarbons from, 159.

- apparatus for testing the inflammability of, 469.

— Caucasian, 159, 705, 1020.

— examination of, 650.

- and other combustible liquids, explosion of, 1181.

Petroleum-coke, products from, 239.

Petroleum-gas, products from the manufacture of, 329.

Petroleum spirit and allied liquids, notes on, 651.

Petroleums, commercial, 330.

Pharmacolite, 532.

Pharyngeal secretion, abnormal presence of uric acid in, 1161.

Phenacite, crystallography of, 397.

Phenanthracene, synthesis of, from orthobromobenzyl bromide, 822.

Phenetoïl, paranitro-, 595.

– bromonitro-, 595. — chloronitro-, 595.

Phenoglucol, 272.

Phenol and nitrophenol, ethylene ethers of, 1136. - action of chlorochromic acid on,

583. - action of nitrogen peroxide on,

584.

- action of phenolsulphonic chloride on, 602.

— amido-, a fourth, 47.

—— detection of, in urine, 115.

—— in the animal economy, 114. —— new mononitro-, 46, 47.

— paranitro-, sulphating, 92.

---- pure, preparation of, 723.

——- testing for, 655.

- trichloro-, from trichloramidophenol, 164.

- and thymol, comparative experiments on the behaviour of, with different reagents, 942.

- ethers, action of nitric acid on some, 723.

- in the animal body, 631.

Phenolite from Fernando de Noronha,

Phenolphthaleïn as an indicator in alkalimetry, 848.

Phenolsulphonic acid, paranitro-, action of bromine and iodine on, 92.

- acids which do not contain the methyl-group, action of nitrosodimethylaniline hydrochloride on, 161.

Phenols, action of aromatic hydroxyacids on, 592.

- action of ethyl chlorocarbonate on, 48.

 compounds of benzotrichloride with, 165.

compounds of mono- and di-basic acids with. Parts II and III, 811.

compounds of monobasic and dibasic acids with, 591.

- direct introduction of carboxylgroups into. Parts IV, 1140.

— etherification of, 264. — orthodiamido-, and their nitrosubstitution products, 92.

 orthonitramido-, and their nitrosubstitution products, 92.

phenoxyacetophenonecarboxylic acid, 733.

Phenoxycinnamic acid, and some of its salts, 276.

Phenoxymethylenephthalyl, 733.

Phenyl, ethereal salts of, and some of their derivatives, 602.

· benzoates, ortho- and para- nitro-,

Phenylic phenylsulphonate, 602.

- action of a mixture of nitric and sulphuric acids on, 603.

- action of phenylsulphonic chloride on, 603.

-- paranitro-, 603.

Phenylacetaldehyde, 582.

Phenylacetic acid, action of bromine on, at high temperatures, 47.

dinitro-, 729.
paramido-orthonitro-, 730. — preparation of, 1034.

- · preparation of, from benzal-

dehyde, 277. Phenylacetylene, action of sulphuric acid on, 279.

Phenylamido-acetic acid, 168.

Phenylamidobutyric acid, 87.

Phenylangelic acid, methylenedioxy-, 727.

Phenylarsene iodide, 723.

orthonitro-, Phenylchlorolactic acid,

Phenylcyanamide, action of acetamide on, 810.

Phenyldimercaptan hydrochloride, metachloramido-, 902.

Phenylditolylguanide, 906.

Phenylethylethylidenedichlorochromic acid, 582.

Phenylglyoxylamide, metanitro-, 814. Phenylglyoxylic acid, 814.

action of nascent hydrocyanic acid on, 277.

Phenylguanidine, 45.

Phenylguanylguanidine and its salts,

Phenylhomocinchonidines, 184.

Phenylisoindole, 262.

Phenyllactic acid and its salts, 427, 428.

— synthesis of, from ethyl malonate, 168.

- amido-, 1044.

Phenyloxyacrylic acid, orthonitro-,

Phenylphenylene-glycocine, and ethyl salt, 176.

Phenylpropiolic acid, orthonitro-, 275. Phenylpropylenedichlorochromic

Phenylpropylenedichromous chloride, 582.

Phenylpyrroline, 721.

Phenylpyruvic acids, amido-, 1044.

Phenylsuccinic acid, 599, 1037.

Phenylsulphonacetic acid, 716.

Phenylthiocarbamidoglycollide, 45.

Phenylthiocarbimide, action of glacial acetic acid on, 591.

- action of hydrochloric acid gas on, presence of absolute alcohol, 811.

- glycollide, 43, 1039.

Phenylthiohydantoic acid, a new, 1039.

Phenylthiourethane, 44.

Phenylurethane sulphide, 45.

Phillipsite and its relations to harmotome and desmin, 695.

- from Salesi, in Bohemia, 995. Phlorizin, action of heat on, 439.

Phloroglucinolparazobenzenesulphonic acid, 42.

Phloroglucol, 1149.

isomerides of, 272.

Phloroglucolphthaleïn, 95. Phloroglucolphthalin, 95.

Phonolite, 1013.

changes produced by weathering of,

Phoronic acid, and its derivatives,

Phosphate, insoluble, estimation of, 645.- soluble, estimation of, in super-

phosphates, 465. Phosphates, action of ammonium ci-

trate on, 845, 847.

 action of citric acid on, 759. — a new series of, 1101.

- behaviour of, in water charged with carbonic acid, 117.

(calcium), estimation of, 759.

- in manure, use of ammonium citrate in examination of, 846.

of Waldgirmes, 525.

- precipitated and soluble, determination of the relative values of, 309.

preparation of, 950.

 reduced or precipitated, estimation of, 940.

- soluble and insoluble, comparative value of, 640.

- relative value of, as manure, 1073.

 soluble reduced, and precipitated, comparative experiments on the

manurial values of, on sandy soils, 758.experiments with, as various,

manure, 120, 1167.

- worthlessness of, as manure for certain soils, 61.

Phosphenyl dichloride, action of, on some chlorides, 97.

Phosphide of sodium, action of haloïd

compounds of hydrocarbon radicals on, 722.

Phosphomolybdates, estimation of phosphoric oxide in, 1169.

Phosphonium iodide, preparation of, 223.

Phosphoplatinic compounds, 802.

- ether, 803.

Phosphoplatinous ether, 803.

Phosphorescence, 670.

of organic and organised bodies, 488.

Phosphorescent bodies, action of light on, 863.

- spectra, discontinuous, in high vacua, 773.

Phosphoric acid, estimation of, 194.

--- estimation of, as magnesium pyrophosphate, 1168.

- estimation of small quantities of, 644.

- — extraction of, 320.
- — form of combination in which it exists in the soil, 457, 934.

- - soluble in "citrate" solution, manuring experiments to determine the value of, 1075.

– — in different combinations, manuring experiments with, 1072.

- - influence of sodium nitrate on absorption of, 457.

- - retrograde, estimation of, 62.

- -- estimation of, by means of ammonium citrate, 464.

Phosphorite, decomposition of, by peat,

- from the South of France, 766. Phosphoritic limestones of the Island of Bonaire, West Indies, 391.

Phosphorus, action of, on hydriodic and hydrobromic acids, 222.

- bromides and iodides of, thermochemistry of, 218.

- chemical toxicology of, 309.

- estimation of, in iron and iron ores, 465.

estimation of, in slag from blast furnaces, 939.

---- estimation of, in steel, 194, 646.

- presence of, in the rocks of Brittany, 700.

- quantitative estimation of, in iron and steel, 194.

betaines, 717.

--- pentiodide, existence and properties of, 507.

- trichloride, action of iodine on,

--- combination of titanium tetrachloride with, 347.

— trichloriodide, 138.

YCL. XL.

Phosphotungstates, estimation of phosphoric oxide in, 1169.

Phosphotungstic acid and its salts,

Photo-electric regulator for paintedglass furnaces, 125.

Photographic images, inversion of, by the prolonged action of light, 1.

Photographs, changes of, by prolonged action of light, 1179.

- coloured, 1178.

Photometry, application of, to the study of diffusion phenomena in liquids, 956.

Phthalic acid, conversion of, into salicylic acid, 585.

- dinitro-, 436.

- anhydride, compounds of, with hydrocarbons of the benzene seria,

condensation-products, 733.

Phthalimide, a base form, 263.

and its salts, 1039.

Phthalylacetic acid, constitution of, 733. Phthalylhydroxylamine, action potash on, 586.

- and its salts, 585.

Phylloxera, researches on, 1069.

- and means of destroying it,

Physics, Lothar Meyer and the latest discovery in, 133.

Phytolacca dioïca, 1151.

Phytolaccic acid, 286.

Picene, a new hydrocarbon from peat tar, 179, 284.

dibromo-, 179.

Picene-quinone, 179. Picite, 525, 528.

Picoline-monocarboxylic acid, synthetic, 612.

Picrites of Nassau, 387.

Picrotin, 286, 440, 740.

Picrotoxin, 286, 740.

chemical nature of, 440.

Picrotoxinin, 440, 740.

Pig-iron, estimation of silicon and titanium in, 647.

dephosphorising, 326.

Pigeons' dung, 121.

Pigment for floors, wood, stone, and brickwork, 483.

Pigs, fattening of, with soja bean, and fleshmeal, 927.

- preparation of food for, 302.

Pilocarpine, 447.

Piperethylalcamine, 1157.

Piperic acid, reaction of the ammonium salt of, 728.

Piperidine, constitution of, 621.

Piperno, 699.

Piperonal, action of aniline on, 729.

1268 Piperonal and its derivatives, 727. Piperpropylalcamine, 1158. Piperylene, 621. - constitution of, 622. Placodin (nickel-speiss), 228. Plagiocitrate, 369. Plagioclase, optical orientation of, 397. Plant, ash of various parts of, 837. - influence produced on the growth of, by previously steeping the seed, 300. Plant-roots, evolution of carbonic anhydride by, 931. Plant-stems, pressure in, 60. Plantain seeds, analysis of, 1066. Plants, agricultural, amount of water appropriated by, 1060. - ammonia in, 116. - constancy in the composition of, 753. decomposition of albumin in, 634. estimation of nitrogen compounds in, 312. - influence of an increased quantity of carbonic anhydride on the growth of, 1060. — influence of light on the liberation of carbonic anhydride by, 1060. — oil-producing, vegetation of, 60.
— quantitative estimation and separation of proteïn matter in, 660. various agricultural, cultivation of, 1069. Plastin, 753. Platinochlorides, new, 922. Platinocyanides, double, 707. Platinous hypophosphite, 226. Platinum, action of flame on, 882. - action of, on coal-gas, 706. - ate mic weight of, 514. detection of small quantities of, 649. — geological occurrence of, in Russia, 769. intensity of the incandescent, luminous radiation from, 669. - metals, chemistry of, 514. - ores, separation of the metals of, 226. - preparation of, 792. - salts, analysis of, 715. Platinum-iridium alloy, 793. Poisoning by carbonic oxide, 1086. Poisons, metallic, destruction of organic matter when searching for, 463. Polar electricity, development of, in hemimorphous crystals by alteration of pressure in the direction of the symmetrical axes, 958. --- of hemihedral crystals with inclined faces, 338. Polarised cells, resistance of, 958. Pollucite from Elba, composition of,

1005.

Polycrase, crystallographic examination of, 398. Polythionic acids contained in Wackenroder's solution, 1098. Pond slime, analysis of, 61. Porcelain, Arita, examination of the raw materials used for, 667. composition of clay for, 324. Porphyrine, 624. Porphyrosine, 624. Potable waters, destruction of microscopic animals in, 1179. - action of potassium permanganate on, at different temperatures, 1172.- — detection of lead in, 1173. estimation of nitrates in, 1173. ---- estimation of organic carbon in, 196. Potash, influence of sodium nitrate on absorption of, 457. - mines, Stassfurt, formation of hydrogen in, 227. – salts as a manure, 1072. Potassio-ferric silicate analogous to leucite, 389. Potassium, estimation of, as platinochloride, 941, 1169. — borocitrates, 89. — boroduodecitungstate, 24. —— carbonate, manufacture of, 1087. cyanate, isomeric, 144. - cyanide and ethyl dichloracetate, 798. dichloracetate, dry distillation of, 408. ferric oxalate, 714. - ferricyanide, preparation of, by means of lead peroxide, 239, 323. — ferrous oxalate, 714. - homopyrroline, action of chloroform on, 827. - hydrogen saccharate, preparation of, 580. - iodide, action of carbonic anhydride on, 975. extraction of, from kelp, 319. - lactonate, 580. — magnesium platinocyanide, 240. - sulphate, a new, 854. - methylresorcinolsulphate, 270. - nitrite, action of, on ammonium chloride, 788. - perchlorate, heat of formation of, 1093. - permanganate, action of chlorine tetroxide on, 353. - --- use of, in quantitative analysis, 843.

use of, in volumetric analysis,

759.

- Potassium, picrate, decomposition of, 1033. heat of formation of, 969. - propargylate, 239. --- pyrroline, action of chloroform on, 826. - resorcinoldisulphonate, action of potassium nitrite on, 1149. —— selenates, new, 1100. — sulphate, preparation of, from the salts of the Stassfurt deposits, 855. - tetrachromate, 352. uranate, 686. --- and sodium chlorides, solubility of a mixture of, 223. Potato plant, influence exerted on the growth of, by allowing the "sets" to decay before planting, 456. Potato-sugar, hurtful action of, 770. Potatoes, best method for manuring, - Chunnos, from Peru, 932. — cultivation of, 301, 455. — diseased, utilisation of, 1066. - effect of the moisture in soils on yield of, 1066. experiments with, 932. growth of sprouts on, 60. influence of heat on the growth of, injurious effect of kainite and superphosphate on the germination of, 300. - manured with peat, nitrophosphate, and sodium nitrate, 642. ---- manuring, 305, 1078. ---- prevention of rot in, 1066. —— specific gravity of, 932. Prehnite, 550. occurrence of, in Tuscany, 26. Preservative fluid, Wickerheim's, 126. Preserved meats, American, analyses of, Press residue from beet, composition of, "Press" and "diffusion" residues as food, comparison of, 757. Pressure, chemical reactions induced by, critical, of substances, 133. union of bodies by, 498. Propaldehyde, action of furfuraldehyde on, in presence of soda, 573. —— dibromo-, 1029. --- parachloro-, 406, 888. Propargylic acid, potassium salt of, - compounds, action of hypochlorous acid on, 1120. Propenyltricarboxylic acid, 156, 579.
- Propionic acid, chlorotribromo-, 1126.  $\alpha$  and  $\beta$ -dichlorodibromo. 1029, 1030. — — double salts of, 797. — tetrabromo-, 889, 1030. — tetrasubstitution derivatives of, 1029. -- --- tribromo-, 800, 889. Propionyl cyanide, 154. – formamide, 154. Propionyl-formic acid and its salts, 154. Propionylquinine, 620. Propyl alcohol, di-iodo-, 242. alcohol, normal, conversion of glycerol into, 1123. - bromide, normal, conversion of, into isopropyl bromide by heat, 567. – glycol, active, 1021. - nitrate, normal and iso-, preparation of, 572. --- parasantonate, 181. – santonate, normal, 181. Propylacetal, 34. Propylamine, preparation of, 572. phthalate, action of phosphorus pentachloride on, 285. Propylazaurolic acid, 896. Propylbenzene, action of chlorochromic acid on, 582. Propylene, chlor-, 793. - oxide from active propyl glycol, Propylenic glycol (normal), heat of combustion of, 9. Propylite, occurrence of, in Transylvania, 698. Protagon, Liebreich's, existence of, in the brain, 1047. Protalbin, 449. Proteïds, digestion of, 296. - influence of borax on the decomposition of, 453.

Proteïn compounds, products of the decomposition of, 1047.

- matter, quantitative estimation and separation of, in plants, 660.

Proteolytic activity of pancreatic extracts, estimation of, 1051, 1053.

Protoplasm, composition of, 753.

Protoquinamicine, 925.

Pseudo-levulin, 149.

Pseudometeorite, so-called, analysis of,

Pseudomorph after garnet, 544.

after spodumene, 1006.

---- hollow, artificial production of, 515. Pseudorcellic acid (orcinolcarboxylic acid), preparation of, 96. Pseudotriplite, 550.

Pseudotropine and its salts, 56, 57. Ptomaines or cadaveric alkaloids, Selmi's, chemical nature of, 1046.

Ptomaïnes considered in relation to judicial chemistry and toxicology, 57.

- test to distinguish, from vegetable alkaloïds, 749.

Pulp from the hydraulic press, nutritive value of, 933.

Pulvamic acid, 97.

Pulvic acid and its salts, 97.

- oxidation and reduction of, 1036.

--- anhydride, 97.

Pumice from Launsbach, 393.

Pumice-glass from Santorin, chemical composition of, 560.

Pumpkin seeds, crystallisable albumin from, 625.

Pupil-dilating alkaloïds, 446.

Purpurin in alum solutions, displacement of the absorption-bands of, 488.

Putrefaction, testing the progress of, in manure heaps, 937.

Pyridine, 110, 611.

— isochloro-, and its salts, 826.

series, bases of, 56, 443, 921.

Pyridine and quinoline series, isomerism in, 744.

Pyridinecarboxylic acids, 744.

Pyridinedicarboxylic acid, 110, 611, 612. Pyridine-y-dicarboxylic acid and its

salts, 612. Pyridinetricarboxylic acid, 110.

— synthetical, 181.

Pyrites, estimation of sulphur in, 193, 764.

from the Böckstein, crystallographic notice of, 232.

magnetic, composition of, 516.

Pyrochroite, 697.

Pyrocoll and its salts, 295.

Pyrogallocarboxylic acid and its salts,

Pyrogallol, action of ethyl chlorocarbonate on, 48.

--- for dry-plate development, preparation of, 662.

Pyroguaiacol, action of potassium hydroxide on, 813.

– and its derivatives, 812.

— tribromo-, 813.

Pyrolusite, artificial formation of, 353.

Pyromucamide, 801.

Pyromucethylamide, 715.

Pyromucic acid, derivatives of, 714, 801.

Pyromucyl chloride, 715.

Pyrope, 544.

Pyrophyllite, 541.

- from Schuykill Co., Pennsylvania,

Pyroracemic acid, action of benzonitril and benzyl cyanide on, 1033.

Pyroacemic acid, dibromo-, action of benzene on, 814.

- compounds, 1032.

Pyroracemic anhydride, isodibromo-, 1032.

Pyroretin, 359.

Pyrotartaric acid, formation of, 155.

- monobromo-, and its salts, 579.

Pyroxene, 995.

- (diopside), artificial, 694.

- from Nordmark in Sweden, 380.

- highly aluminous, from Amhurst Co., analysis of, 554.

Pyroxene group, constitution of, 371.

Pyrroline, formation of, 614.

Pyruvic alcohol and its derivatives, 1121.

Quantivalence, so-called differences in, of a multivalent atom, 679.

Quartz, crystallised, artificial production of, 346.

from the Eleanor Mine, on the Dünstberge, near Giessen, 25.

- Moravian, 550.

Quartz-crystals from Alexandra Co., 1110.

Quebrachicatechin, 1153.

Quebrachine and its salts, 294.

Quebrachitannic acid, 1152.

Quebracho-bark, test for, 473.

Querciglucol, 272.

Quercitannic acid, 277.

Quick-lime, action of dry carbonic anhydride on, 348.

Quinacetophenone, 812.

Quinamicine, 924, 925.

Quinamidine and its salts, 924, 925.

Quinamine, action of acetic anhydride, ethyl iodide, and acids on, 923.

and its derivatives, rotatory powers of, 926.

preparation and salts of, 922.

Quinic acid, schizomycetic fermentation of, 602.

Quinine, estimation of, 1176.

--- dimethiodide, 619.

— ethomethiodide, 619.

--- meth-ethiodide, 619.

— methiodide, 619.
— methyl- and ethyl-derivatives of, 619.

---- methylchloride, 619.

--- officinal test of, 63.

— methylbromide, 619.

---- platinochloride, 922.

- sulphate, commercial, optical estimation of cinchonidine in, 315.

Reaction without the intervention of a Quinine sulphate, water of crystallisation solvent, 873. - testing of, for foreign alkaloïds, 63. of temperature and pressure on, 334. - wine, estimation of alkaloïds in, Rennet, action of, under various circum-204. stances, 1183. Quiniphenol, 613. Resaceteïn, 811. Quinoïdine borate, a new febrifuge, 1154. pound, 811. Resaurin, 812. - crystalline, 56. Quinol, action of ethyl chlorocarbonate on, 48. --- of Leptandra, 103. --- a derivative of, 595. oil, light, 101. oils, analysis of, 202. - ethers of, action of nitric acid on, 1139. monethyl ether, 166. 687. - reaction of, with hydrogen potassium carbonate, 1140. salts, 265, 266. Resorcinol, action of ethyl chlorocarbo-- some aldehydes and alcohols derived from, 166. nate on, 48. Quinoline, 287, 829. - action of glacial acetic acid on, - action of benzyl chloride on, 182. 591. nascent hydrogen on, 183.
sodium on, 613. --- benzyl chloride, 182. - action of, on urea, 95. --- bromine-derivatives of, 741. - crude, fractional distillation of, —— derivatives, 270. 612. - di- and tri-nitro-, 1132. — derivatives, 742. --- physiological and physiologico-726.chemical effects of, 298. - dinitramido-, 113**3.** -- reactions, 655. --- reduction of, 444. 1134.—— synthesis of, 182, 287, 919. - series, studies on, 1043. derivatives of, 727. matters from, 726. 744. Quinolinic acid, 919, 1043. Quinols, bromo-, 1135. —— nitro-amido-, 1133. Quinone, action of acetic anhydride on, 1136.— derivatives, 1135. — action of iodine on, 1149. - nitro-, 583. Resorcinoldisulphonates, Quinonechlorimide and similar subcaustic alkalis on, 1148. stances, 163. Quinonedichlorodiimide, 164. 1147.Quinones, action of amines on, 915. — —— (II), 595. bromo-, 1135.

chloro-, action of ammonia and amines on, 812.  $\beta$ -Resorcylic acid, 270. Reussinite, 359. Rhabdite, 690. a-Quinophenol, 743.

#### R.

Rain-water, descent of, down treestems, 61. Raisins, wine from, 198. Razumowskyn, 541.

Refraction, double, influence of change

Resacetophenone and its amido-com-

Resin, new, from Köflach, in Styria, 359.

Resins, new fossil, from East Prussia.

a- and β-Resodicarboxylic acid and its

- action of nitrous acid on the methyl and ethyl ethers of, 726.

- colouring-matters, 726.

- diazo-, and the ethyl ether of,

- dinitrodiazo-, action of potash on,

— methyl and ethyl ethers of, nitro-

- monoethyl ether of, colouring

--- mono- and di-ethyl-, 48.

---- mono- and di-nitrodiazo-, 1134.

Resorcinolsulphonates, 1147.

action

Resorcinoldisulphonic acid and its salts,

Resorcinolmonosulphonic acid, 1148.

--- iodo-, alkaline salts of, 1149.

Rhodium, 514.

- action of, on coal-gas, 706.

Rhodochrosite (manganspath), 531.

Rice meal, feeding cows with, 297. Rice soils from Burmah, analysis of, 838.

River water, estimation of nitrates in, 1173.

Rochelle salt, influence of, on the activity of yeast, 1058.

Rock enclosures in the basalt of the Persanyer Gebirge, 703.

- of Monte Tajumbina, in Peru,

Rocks, eruptive, a group of dissimilar, in Campton, New Hampshire, 701.

- ferruginous, of Ovifak and Assuk, in Greenland, 28.

miscellaneous, notes on, 542.
 occurring between Puerto

Tablas on the Orinoco, and the gold districts of Caratal, 390.

- of Kerguelen's Land and the neighbouring islands, 391.

Roots, plant, evolution of carbonic anhydride by, 931.

Rosaniline, 162.

- detection of, in wine, 314.

Rosanilines, existence of three isomeric,

Rose-quartz, 550.

Roseocobaltamine pyrophosphates, action of heat on, in presence of water,

Rosterite, a new variety of beryl, from Elba, 1009.

Rotatory power of carbon compounds,

--- of carbon compounds, multiples in, 403.

Roumanian salt, mechanical and chemical analysis of, 935.

Rutus chamaemorus, colouring matter of, 129.

Rufigallie acid, decomposition of, 282.

Russia, black earth of, 1070.

Rutherfordite, 382.

Rutile in gastaldite-eclogite from Val Tournanche, 370.

Rutylene, 795.

Saccharin, 149.

—— Peligot's, 567.

- presence of, in osmosed sugar, 148.

Saccharinic acid and its salts, 149.

----- anhydride, 149.

Saccharoses, 567. Sainfoin, cultivation of, 456.

Saki, 1059.

Salicin, action of heat on, 439. Salicylaldehyde, paramethoxy-, 271.

Salicylamide, action of hydrochloric acid on, 42.

Salicylic acid, applications of, 860.

--- conversion of phthalic acid into, 585.

Salicylic acid, detection of, in urine, 472. destructive action of wood on,

- estimation of, in beverages,

944.

 estimation of, in food-stuffs by a calorimetric reaction, 1175.

— synthesis of, 1035. use of, in the dairy, 1185.

Salicylphenol, 592.

Saline solutions, electrical conductivity of, 71.

Saliva, abnormal presence of uric acid in, 1161.

Salt-bush of New South Wales, 1067. Saltpetre, manuring wheat, barley, and oats with, 938.

Salts, absorption of, by the soil, 1165. - certain, influence of, on digestion,

752. containing the same haloïd ele-

ments, action of the haloïd acids on, decomposition of, by liquids, 17.

--- influence of temperature on the distribution of, in solution, 5.

- inorganic, importance of, in feeding animals, 1050.

- isomorphous, optical properties of mixtures of, 2.

- of the alkali and alkaline earth metals, solubility of mixtures of, 978.

organic, of alkalis and alkaline earths, elementary analysis of, 124.

- part played by time in the formation of, 344.

-- thermochemistry of double decomposition in aqueous solutions of, 869.

union of, by pressure, 501.

- volume relations in the formation and decomposition of, 219.

Samarium, 979.

 absorption-spectrum of, 349. Samarskite, 1110.

- earths of, 73.

Sambucus canadensis, bark of, 1163.

Sand vetch, a new fodder plant, 1065. Sandy soils, comparative experiments on

the manurial values of soluble, reduced, and precipitated phosphates on, 758.

Santonic acid, action of phosphorus pentachloride on, 286.

Santonin, derivatives of, 53.

- two isomerides of, called metasantonin, 285.

Santonin-derivatives, optical rotary powers of, 180.

Santorin and its eruptions, 555.

- gaseous emanations of, 558. Sapphirin, 234.

Saussurite-gabbro, analysis of, 698.

Scapolite family, peculiar mineral of, 381. - from Monte Monzoni, 549.

Schaalenblende, 990.

Scheelite, 995.

Scheibler's method of estimating sugar in beet, 851.

Schieferspath, 383.

Schrötterite, 540.

Scolecites, mono- and a-symmetrical, 1007, 1008.

Sea-water, extraction of magnesium salts from, 1180.

Sea-weeds, incineration of, in the manufacture of iodine, 318.

Secondary piles, efficiency of, 868.

Seed, influence produced on the growth of the plant, by previously steeping the, 300.

Seeds, action of vapours on, 837.

- influence of light on the germination of, 1061.

- of Cassia occidentalis, from Martinique, 483.

- of Cocculus indicus, constituents of,

— torpid condition of, 837.

 selenates, volume constitution of, 137.

Selenium-compounds, new, 1099.

Selenium resistance rods for photophonic purposes, 339.

Semigluten, 294.

Sequoia gigantea, new hydrocarbon from, 98.

Sequoiene, 99.

Sericite of Hallgarten, in the Rheingau, 543.

Serpentine, 544.

from the Jupiter-Tagbau, 997.

- from Verrayes, in the Valley of Aosta, 693.

Serpentines, Tuscan, composition of, 1012.

Serum albumin in muscle, 630.

Sewage, experiments with, 936.

—— irrigation with, 842.

🗕 in oysters, 953.

---- precipitation, chemistry of, 662. Seybertite, 233.

Sheep, fattening of, 834.

- merino, relation of wool to body weight in, 1054.

Shellac-varnish, aqueous, 482.

Shoddy, analysis of, 661.

Siderite or ferrous carbonate, 995.

Sikimine, 918.

Silica, grains of, in the atmosphere,

Silicates, decomposition of, 645.

Silico-aluminates, alkaline, synthetic production of, 350.

Silico-molybdates, 880.

Silicon, estimation of, in iron and steel, 194, 647.

— oxychlorides, preparation of, 508. – sulphide, 494.

Silk and wool, separation of, in textile fabrics, 1177.

Sillimanite in the gneiss of the Morvan, 1005.

Silver bromide, action of light on, 862.

--- photochemistry of, 762.

- dry plates for different portions of the solar spectrum, sensitiveness of, 773.

- dry plates, new developers for, 317.

- chloride, solubility of, in hydrochloric acid, 880.

- - bromide and iodide, effects of heat on, 965.

- chlorobromiodide, contraction of. 496.

--- chlorobromiodides, some, effects of heat on, 965.

 cyanide, decomposition of, 794. dichloracetate, action of heat and

water on, 574.

- dry, action of heat on, 575. ---- emetic, 419.

— iodide, crystalline form of, 398.

--- molecular action of, on carbon chlorides, 707.

- monochloracetate, action of heat and water on, 574.

- preparation of, at the "Stefansfoundry in the Zips," 768.

- quantitative estimation of, in galvanic silver-baths, 468.

- salts, inorganic, action of chlorine on, 354.

- separation of, from lead, 760.

 solubility of, in presence iodides, 1101.

--- sulphate, 354.

- trichloracetate, action of heat and of heat and water on, 575.

Silver-lead iodide, coefficients of expansion of, 495.

 expansion-coefficients of, 966.

Sismondin, 234.

Size, estimation of, in textile fabrics. 1178.

Skatole, preparation of, from indigo,

Skatole-forming substance, 175.

Skatolecarboxylic acid, 175.

Skim-milk from De Laval's centrifugal separator, composition of, 771.

Slag, crystallised, isomorphous with olivine, 1016.

Slag from blast furnaces, estimation of phosphorus in, 939.

Slags, decomposition of, 645.

Smoke under the microscope, 505.

Soap, preparation of, 858.

transparent, detection of alcohol in, 314.

Soda, nature of the insoluble form of, existing in the residue left on cauticising sodium carbonate solutions with lime, 508.

—— industry, novelties in, 321, 764.

Soda-liquors, exidation of, 765. Soda-lye, rendering it caustic, 764.

Sodio-aluminic silicates formed by the action of sodium carbonate on kaolin,

Sodioferric oxalate, use of, for certain photographic purposes, 671.

Sodium arsenate, 141.

- bicarbonate, impurities in, 138.

borocitrates, 89.borodecitungstate, 24.

- borotungstates, 224.

— carbonate, influence of the continued use of, on the composition of the blood, 1161.

- — ferric oxalate, 714.

- ferroyanide, preparation of, 143.

hydrogen sulphite, action of heat on, 224.

—— hyposulphite, 682, 976.

--- composition of, 508.

— (Na<sub>2</sub>SO<sub>2</sub>), use of, in the estimation of copper, of indigo, and of dissolved oxygen in water, 310.

- nitrate, decomposition of, by calcium carbonate, 322.

--- oxide, combination of, with carbonic anhydride, 348.

\_\_\_ spectrum of, 862, 957.

— manufacture of, by the direct process, 664.

native, from Sicily, analysis

of, 524.

tungstates, action of arsenic and

phosphoric acids on, 1107.

tungstoborate, 879. uranate, 686.

and calcium, crystallised double sulphate of, 509.

Sodium and potassium chlorides, solubility of a mixture of, 223.

Soil, absorption of salts by, 1165.

-— form of combination in which phosphoric acid exists in the, 457, 934.

Grandeau's theory of the fertility of, 1166.

bumus extracted from, by alkalis, 839.

influence of superficial drying on the temperature and moisture of,

influence of trenching on the temperature and moisture of, 60.

method of ascertaining the absorptive power of, 637, 935.

newly-broken, removal of iron from, 638.

organic matters in: examination of Grandeau's theory, 117.

permeation of water through, 1071.

Roumanian, mechanical and chemical analyses of, 935.

Soils, cause of beet-sickness in, 634.

effect of the moisture in, on yield of potatoes, 1066.

—— percolation of water through, 303.

--- permeability of, to air, 302.

----- sandy, and manuring with artificial manures, 304.

various, examination of, 456. warmth in, 1071.

Soja bean, cultivation of, 116, 938.

fattening of pigs on, 927.
a sugar present in, 1121.

Solar spectrum, measurement of the intensity of some obscure rays of, 333.

— photographic method of mapping the least refrangible end of; with a map of the solar spectrum from 7600 to 10750, 957.

---- rays in, produced by atmospheric absorption, 1.

773. telluric rays of, 1091.

spots, iron lines widened in, 957.

Solids, absorption of gases by, 971.
——solubility of, in gases, 970.
Sulphonacetic acids, 716.

Solution of density 3.28 suitable for mineral analysis, 1168.

Solutions, aqueous, effects of electric currents on the surfaces of mutual contact of, 962.

with platinum electric behaviour of,

Sorbin, 148.

Sorbite, 148.

Sorbite-formamide, 148.

Sorgho, development of sugar in, 634.

distribution of sugar in, 60.

South American geology, contribution to, 390.

Spanish minerals, 1110.

Specific dispersion of isomeric bodies, 213.

Specific gravity determination, differential method of, 938.

— of formates, 496. — of potatoes, 932.

Specific heat of chlorine, bromine, and iodine gases, 784,

of gases and vapours, 340.

its relation to the molecular weight, 963.

Specific magnetism of ozone, 340.

Specific refraction of isomeric bodies, 213.

Specific rotatory power of cane- and invert-sugar, 653.

Specific volumes of oxides, 219.

Spectra, discontinuous phosphorescent, in high vacua, 773, 957.

- photographic, of stars, 485.

—— of compound gases, 221.

— of the compounds of carbon with hydrogen and nitrogen, 957. Spectral lines of different elements,

identity of, 957.

Spectrum, influence of the molecular grouping in organic bodies on their absorption in the infra-red region of, 487, 957.

---- luminous, of water, 1.

--- observation, new method of, 956.

of carbon, note on, and history of, 957.

- of carbonic anhydride, 861.

--- of iron in the sun, 669.

--- of magnesium, 955, 957.

--- of sodium, 862.

— of the flame of hydrogen, 957. Spiegeleisen, crystalline form of, 789. Spigeline, a new volatile alkaloid, 1153. Spirit, diluted, formulæ for calculating

the quantity of water added to, 1182.

Spirit, use of maize in the preparation of, 330.

Spleen-fungus, artificial generation of, 59.

Spodumene, 694.

and its alterations; from the granite veins of Hampshire County, Massachusetts, 1005.

Spring, hot, at Bagnoles de l'Orne, and the deposits formed in the conduits, 81.

— at Nabmoo, near Maulmain, British Burmah, 1019.

- barley as green fodder, 755.

Springs, hot, in New Britain and the Fiji Islands, water of, 1019.

zuela, 563.

Stable-dung as manure for beet, 842.

—— manure, money value of, 1076.

occurring on, when kept, 937.

Stantienite, 687.

Starch, conversion of, into sugar, by the action of dilute sulphuric acid at high temperatures, 149.

—— estimation of, in pressed yeast, 943.

—— grape-sugar from, 770.

---- modification of, 888.

—— use of maize in the preparation of, 330.

Starch-grains, formation and growth of, 1061.

Starch-paste, effects of diastase on, 1024.

Starch-sugar mechanically mixed with commercial cane-sugar, detection of, 654.

Stars, photographic spectra of, 485, 956. Staurolite, hemihedral forms of, 382.

Steel, condition of carbon in, and the effect of "hardening" upon it, 478.

estimation of chromium in, 646.
estimation of phosphorus in, 646.

estimation of silicon and titanium in, 647.

for the manufacture of dies, 856.

— manganese in, 950.

— quantitative estimation of phosphorus and silicon in, 194.

—— Siemens-Martin, notes on, 667.
—— varying condition of carbon in,

and its influence on Eggertz's coloration process, 466.

Stilbene and some of its derivatives, new formation of, 1150.

— dicyano-, 47.

---- reduction of, 48.

Stilbite (heulandite) from Kerguelen's Island, 695.

Stilpnomelane, 990.

Strengite, 528,

Strobometric observations on the inversion of cane-sugar by concentrated hydrochloric acid at the ordinary temperature, 243.

Strontiochromic oxalate, 1031.

Strontium chromate, crystallised, preparation of, 352.

nitrate, hydrated, amount of water of crystallisation of, 509.

-- oxide, action of carbonic anhydride on, 878.

---- oxychloride, 979.

Strychnine, 747.

--- chlorinated derivatives of, 292.

--- compound of, with iodoform, 748.

—— dinitro-, 748.

——— nitrate, 748.

isolation of, 1176.sulphate, 831.

"Stuppfett" examination of, 823.

Styphnamic acid, 1133.

Styrene,  $\beta$ -bromo-, action of water on, 418.

—— α-chloro-, action of water on, 418. Suberic acid, preparation of, 894.

— and azelaic acids, separation and properties of mixtures of, 891.

Subsoils, various, examination of, 456.

Succinamide, diamido-, 578.
Succinic acid, action of bromine on,

248. —— cyanamido-compounds

influence of, on the fermentation of cane-sugars, 836.

ethers of, 253.

--- acids, mono- and dibromo-, preparation of, 577.

—— anhydride, isodibromo-, 253. Succinocyamide, and its salts, 259.

Succinceyanic acid, and its salts, 258.

Succinocyanimide, 259.

Succinone, 1031. Succinylfluorescein, 592.

— tetrabrom-, 592.

Succotash, tinned, analysis of, 212.

Sucrose, preparation of, from glucose, 402.

Sugar, beet-. See beet-sugar.

Sugar, conversion of starch into, by the action of dilute sulphuric acid at high temperatures, 149.

development of, in sorgho, 634.
distribution of, in sorgho, 60.

Fehling's solution as a qualitative reagent for, 851.

found in the liver after rigor mortis, nature of, 628.

Sugar from the tannin of the oak-bark, 1021.

in beet, Scheibler's method of estimating, 851.

— in the animal system, new line of research bearing on the physiology of; 1058.

inversion of, during manufacture, 127.

---- inverted, some properties of, 148.

osmosed, presence of saccharin in, 148.

— potato-, composition and unwholesome effects of, 332.

present in the grain of Soja hispida, 1121.

raw, inversion of, by carbonic acid, 148.

separation of, from molasses, 128.
 use of maize in the preparation of,

Sugar-manufacture, 951.

\_\_\_\_ action of animal charcoal in,

Sugars, raw, spontaneous changes in, 332.

various, relation of, to Fehling's solution, 887.

Suint of Russian wool, extraction of potash from, 475.

Sulphacetic acid, 716.

of.

Sulphaminebenzoic sulphinide, 816.

Sulphaminemesitylenic acid, salts of, 821.

Sulphaminemesitylenic acids, ortho- and para-, and their salts, 429, 430.

Sulphaminemetatoluic acid, oxidation of, in alkaline and in acid solution, 1038.

Sulphamine-sulphobenzoic acid, 817. Sulphaminetrimesic acid, acid potassium salt of, 432.

Sulphamine-uvitic acid, 821.

— volume constitution of, 137.

Sulphides, estimation of sulphur in, 645.

thermochemical researches on, 492. union of, by pressure, 501.

Sulphimidoterephthalic acid, amide of, 819.

Sulphobenzenes, amido-, formation of, from nitrobenzene and aniline, 93.

Sulphohydroxysalicylic acid, and its salts, 1141.

Sulphoisophthalic acid, and its salts,

Sulphonaphtholetherphosphoric acid, barium salt of, 915.

Sulphonic acids from nitramido- and diamidobenzenes in ortho- and metaseries, 93.

Sulphoterephthalic acid and its salts, 278, 819.

Sulphouvitic acid, and its salts, 431.

Sulphur, action of, on certain metallic solutions, 1097.

- action of, on water, 21.

bromide, heat of formation of,

-chloride, heat of formation of, 673.

- bromide, and iodide, heat of formation of, 673.

— chloronitride, 346.

--- estimation of, 940.

--- in pyrites, 193, 764.

- in sulphides, coal, and coke, 645.

--- from the Petzen, crystallographic notices of, 232.

- heats of formation of the oxides of,

- iodide, heat of formation of, 673. - native, contemporaneous produc-

tion of, in the subsoil of Paris, 227. —— ores, estimation of sulphur in, 845.

- oxides, heat of formation of, 673.

---- phosphide, liquid, 72.

--- and nitrogen, some compounds of,

--- with copper and iron, crystals of a compound of, from Röras, 353.

Sulphuretted hydrogen, 876.

- --- apparatus, 787.

Sulphuric acid, free, formation of, in the gastropoda, especially Dolium galea,

- fuming, amount of sulphuric anhydride in, 1097.

- --- loss of oxides and nitrogen in the manufacture of, and a means of preventing it, 475.

— anhydride, amount of, in fuming sulphuric acid, 1097.

---- heat of vaporisation of, 876. Sulphurous anhydride, heat of formation of, 673.

Sulphydrates, characteristic colour reactions with, 646.

Sumach, estimation of tannin in, 1085.

Sun, constitution of, 955.

---- spectrum of iron in, 669. Sun's rays, absorption of, by the carbonic anhydride of the atmosphere,

- measurement of the actinism of, 955.

Superbin, 104.

Superphosphates, injurious effect of, on the germination of potatoes, 300.

- estimation of soluble phosphate in, 465.

Svanbergite, 991.

Sweat, abnormal presence of uric acid in,

Swedes, 756.

Szaboite, 236, 237.

- new locality of, 378.

### Т.

Tannin as alkalimetric indicator, 946.

— estimation of, 473.

---- in sumach, 1085.

---- in tea, 1176.

- new process for extracting, by dialysis, 858.

of lingue bark, 601.
of oak-bark, 901.

of the oak-bark, sugar from, 1021.

Tanning, 481.

- new observations in, 1186.

Tar leucoline, 1043.

Tarnine, 446.

---- hydrobromide, 446.

Tartaric acid, action of dehydrating agents on, 417.

fermentation of, 256. reaction, 655.

Tartar emetic, constitution of, 156.

Tartronic acid, 714.

- - produced by the oxidation of glycerol with potassium permanganate, 256.

Taznite, 998.

Tea, Bohemian, analysis of, 131.

estimation of tannin in, 1176.

from Thea, analysis of, 443.

Telluric rays of the solar spectrum, 1091.

- silver from Batés in Transylvania, 364.

Tellurium, fluo-salts of, 223.

Temperature, changes of, during digestion, 926.

 critical, changes of state near, 677. - influence of, on the germination of

bunt spores, 455. Terebenthene, action of chlorochromic acid on, 583.

- conversion of, into cymene, 39.

----- hydrochlorides, 437.

Terebenthenes, 437.

Tcrecumic aldehyde, 582.

Tertiary aromatic bases, compounds of benzotrichloride with, 165.

- bases, condensation of, by nitric oxide, 101.

Tertiary bases and aromatic acids, condensation-products of, 587.

Tetrabenzylphosphonium, chloride of, and its salts, 722.

salts of, action of haloïd compounds of hydrocarbon radicals on, 722.

Tetradymite from Horhausen near Neuwied, 551.

Tetrahedrite, new form of, 227.

Tetrahydrocinchonic acid, 830.

Tetrahydrocornicularic acid, 1037.

Tetrahydroellagic acid, 815.

Tetrahydromethylquinoline, 742.

Tetrabydroquinoline, 830. - and its derivatives, 444.

Tetramethylammonium nitrate, bromide and iodide, 1027.

- nitroprusside, 883.

Tetramethylbenzene, 40.

Tetramethyldiamidodiphenylethane and its salts, 160.

Tetramethyldiamidotriphenylmethane and its salts, 588, 589.

 a green dye from, 483. Tetramethyldiphenyldiamine, 161.

Tetramethylsulphamide, 717.

Tetramethyltetrazone, 152.

Tetranhydronaphtholsulphonic acid and its potassium salt, 914.

Tetraphenylethane, 434.

preparation of, Tetraphenylethylene, 913.

Tetratolylethylene, preparation of, 913. Tetraxylylmethylene, preparation of, 913.

Tetrazodiphenyldisulphonic acid, 428. Tetrolic acid, 793.

and its derivatives, 413.

and its homologues, 255.

Tetroxyanthraquinone, 266.

Tetrylenedicarboxylic acid and its salts, 1127.

- symmetrical, 801.

Textile fabrics, estimation of size and dye in, 1178. separation of wool and silk

in, 1177.

 a cause of alteration of, 1185. Thalictrine, 52.

Thalictum macrocarpum, substance extracted from, 52.

Thallium silico-molybdate, 880.

Thapsia garganica, 181.

Thaumasite, 1000.

- a new mineral from Aareskutan,

Thenardite, 1109.

- from Lake Balschasch, in Central Asia, 549.

Theobromine, 747.

Thermal electrolysis, 868.

Thermochemical relation of homologous and isomeric substances, 11.

Thermochemistry, 8.

Thermo-electric electromotive forces, developed by the contact of a metal and a liquid, measure of, 336.

Thermometers, cause of variation of the fixed points of, 342.

mercury, rise of the zero point in,

4, 5. Thiacetone, formation of, 711.

Thiocarbamides, substituted, action of carbonyl chloride, and of alcoholic bromides, &c., on, 905.

Thiocarbanilide, action of carbonyl chlo-

ride on, 905.

- action of ethylene bromide on, 906. --- action of methyl and ethyl iodide on, 906.

Thiocarbimides, action of hydrochloric acid gas on, in presence of absolute alcohol, 811.

Thiocarbonates of potassium and other metals, 855.

Thiocholestrophane, synthesis of, 896.

Thiocyanacetic acid and carbaminthioglycollic acid, a compound of, 715.

Thiocyanic ethers, action of hydrochloric acid gas on, in presence of absolute alcohol, 811.

Thiocyanuracetic acid, 715.

Thiodithiazyl, dichloride of, 976.

Thiohydantoïn, carbamidacetosulphonic acid, a new derivative of, 257.

Thiosinamine, 207.

Thiotrithiazyle, 222.

Thiourethanes, constitution of, 44.

Thiovaleraldehyde, 34.

Thorite, analysis of a mineral resembling, 1009.

Thrombolite, 368.

Thulite (zoisite), crystallographic examination of, 398.

Thulium, spectrum of, 349.

Thymol, synthesis of, 593.

and phenol, comparative experiments on the behaviour of, with different reagents, 942.

- monobromamido-, hydrochloride, 591.

— monochloramido-, 590. — monochlorodiazo- 590.

Thymoquinol, 591.

Thymoquinone, action of methylamine on, 595.

- dibromo-, 591.

- dimethamido-, and its derivatives, 596.

dimethylido-, and its derivatives,

- methylamido-, and its derivatives,

Thymoquinone, methyliodo-, and its derivatives, 596.

– mono- and dichloro-, 590.

Thymoguinonchlorimide, 590.

"Tin, cry of," phenomenon commonly called, 783.

- molecular properties of, 685.

Tinder-ore of Clausthal, 24.

Tinned foods, analysis of, 211.

Tinstone or cassiterite, 549, 995.

Tissue change, researches on, in five children aged from two to eleven years, 189.

Titaniferous peridote from Zermatt, 693.

Titanium, estimation of, in pig-iron and steel, 647.

- reversal of the lines of the vapour of, 957.

tetrachloride, combination of, with ethyl ether, 240.

- combination of, with phosphorus trichloride, 347.

- --- and benzoic chloride, combination of, 273.

Titanomorphite, a new calcium titanate,

Titanotungstates, 880.

Titration, accurate perception of colourchange in, 121.

Tobacco, analyses of, 68.

combustibility of, 68.

Toluene, action of amyl chloroxalate on, 731.

— chlorochromic acid on, 581.

– ethylene bromide on, presence of aluminium chloride, 260. nitrogen peroxide

584.

— azo-derivatives of, 432.

— dinitro-, 724.

— electrolysis of, 721.

— illuminating power of, 329. --- nitro-, action of chlorochromic

acid on, 583. - orthonitro-, action of amyl chlor-

oxalate on, 731.

- parabromo-, action of chlorochromic acid on, 581.

a-Toluenedisulphonamide, 816.

a-Toluenedisulphonic acid and its derivatives, 816.

- chloride, 816.

Tolueneparasulphydrate, orthamido-, action of acetic anhydride on, 597.

Toluenesulphydrates, amido-, 596.

Toluenetrisulphonamide, 429.

Toluenetrisulphonic acid and its salts, 429.

Toluic acid, methoxynitro-, 269.

— parachloralpha-, 803.

Toluidine ferrocyanides, meta- and ortho-, 261.

Toluquinol, action of hydrogen potassium carbonate on, 1141.

Toluquinolines, 920. a-Toluylamide, 43.

Tolylquinines, 620.

Tolylthiocarbimide glycollide, 43.

Tolylthiourethane, 45.

Tomatoes, tinned, analysis of, 212.

Topaz, fluid enclosures in, 25.

- Russian, 694.

Torbanite or kerosene mineral, inorganic constituents of, 988.

Tourmaline, electrical phenomena of, 339.

---- from Chili, 551.

- from the Hörlberg, 550.

- laws of the development of electricity by the action of pressure on,

Tragacanth, comparative examination of various kinds of, 212.

Trenching, influence of, on the temperature and moisture of soil, 60.

Triacetin, 408.

Triacetonediamine, 420.

Triacety laurin, 900.

Triamylamine and its salts, 34.

Tribenzarsenious acid, 905.

Tribenzarsinic acid, 905. Tribenzylphosphine, oxide of, 722.

oxide and its salts, 263.

Tricalcium phosphate, solubility of, in ammoniacal and neutral alkali-salts, 845.

Tricarballylic acid, 800.

Tricarbinols, 82.

Trichromic tetrasulphide, 225.

Tridymite, artificial production 384.

 conversion of the distillationvessels of zinc-furnaces into zinc-spinell and, 520.

- from New Zealand, 551.

Triethylalcamine, 1158.

Triethylamine, action of, on the monhaloïd paraffin-derivatives from secondary and tertiary alcohols, 1024.

platinocyanide, 707.

Triethylbenzene, oxidation of, 259.

Triethylmethylammonium methylsulphate, 241.

Triethyloxamide, 718.

Triethyl-phosphine, action of chloracetic acid and ethyl chloracetate on, 717.

Triethylphosphobetaine, 717.

- ethylchloride of, 717.

Triferric tetroxide, allotropic modification of, 75.

Trimethylamine, commercial, action of, on  $\beta$ -naphthol, 177.

constituents of, 1025.

Trimethylamine from commercial tri-Uranates, 686. methylamine, 419. Uraninite, 1110. hydrochloride, commercial, methyl-Uranium, quantitative separation of, amine in, 83. from the alkalis and alkaline earths, 4. - --- separation — salts, some new, 1123. oftrimethylamine from, 246. --- trioxide, specific gravity of, 220. preparation of, 1027. Uranium-black, 79. - separation of, from the commercial Uranium-red, 79. hydrochloride, 246. Uranochre, 1110. Trimethylconylammonium hydrate, 746. Uranothorite, 1009. - iodide, 746. Uranotil, 362, 1110. Trimethyl-β-naphthylammonium hy-Uranyl salts, action of, on turmeric drate, 177. paper, 122. Trimethylphenylammonium bromide. sulphide, products of decomposition synthesis of, 722. and metamorphosis of, 79. - methylsulphate, 241. Urea, action of resorcinol on, 95. Trimethylpiperyl iodide, 621. action of sodium hypobromite on, Trioxymaleic acid, Tanatar's, 714. 316. Trioxymethylene, 1123. -action of sulphonic chlorides on, 164. Triphenylene, 435. estimation of, by means of standard Triphenylmethane, diamido-, 589. sodium hypobromite, 1085. — dimethylamido-, 588. —— fermentation of, 1059. --- preparation of, 912. --- formation of, from ammonia salts - tetramethyldiamido-, and its salts, of organic acids, 453. 588, 589. - formation of, in the animal Triphylin, 550. organism, 192. Tripolite, earthy, 545. relation of, to the total nitrogen of Trippkeite, 551. the urine in disease, 1055. Tritolylarsine, 905. Uric acid, abnormal presence of, in the Trommer's test, decompositions which saliva, gastric juice, nasal and pharyngeal secretions, the sweat, uterine secretions, and in menstrual blood, occur in the use of, 795. ---- sensitiveness of, 851. Tropeïnes, 420, 1157. 1161. Tropic scid from acetophenone, syn- rapid estimation of, 944. thesis of, 277. Urine after administration of quinine — synthesis of, 171. and morphine, 192. Tropine, constitution of, 263. - amount of nitrogen excreted in, by man at rest, 1056. Trypsimetry, 1053. - detection of iodine in, 644. Tuff-rock, 1012. — — phenol in, 115. — — salicylic acid in, 472. Tungstates, new method of analysing, — diabetic, 1162. Tungsten, separation of, from antimony, arsenic, and iron, 1171. — estimation of glucose in, 315. Tyrosines, isomeric, 1044. - in disease, relation of the urea to Tysonite from Colorado, 364. the total nitrogen of, 1055. - incompletely oxidised sulphur in, 298. lactic acid fermentation in, 928. U. - normal human, glycerolphosphoric acid in, 631. - occurrence and origin of methyl-

U.

Ultramarine, composition of, 509.

— rich in silica action of hydrochloric acid at high temperatures on, 138.

— compounds, some, 351.

Ultramarines, analyses of, 139.

Ultra-violet rays, absorption of, 1091.

Unit in absolute electrical measurements, 334.

Upper Harz, injurious effect of furnace-

gases in the woods of, 1179. Uramil, action of bromine on, 801. Urolutein, 1056. Uterine secretions, abnormal presence of uric acid in, 1161.

amine and methylcarbamide in, 631.

— quantitative estimation of chlorides

Uvic acid, formation of, 155.

in, 643.

Urobilin, 1056.

Urohæmatin, 1057.

Uvitonic acid, constitution of, 173.

# V.

Valeric acid and its salts, 411. --- ethylamido-, 713. — fermentation, normal, 798.

---- iodo-, 414.

---- methylamido-, 713.

- normal, conversion of levulic acid into, 411.

— —— phenylamido-, 713.

Vanadinite, 1108.

—— analysis of, 532.

— composition of, 1001.

- from Cordoba, crystalline form of,

Vanadium compounds, natural, composition of, 1000.

- occurrence in commercial caustic soda, 856.

Vapour under the microscope, 505.

Vapour-densities, acoustic method of determining, 12.

- of homologous ethers, 782. Vapour-density determinations of a few hydroxylamine derivatives, 571.

- of the halogens, 872.

Vapour-tension of mixed liquids, 1093. Vapour-tensions of homologous series, and Kopp's law of constant difference of boiling points, 71.

Vapours, cooling power of, 341.

- metallic, reversal of the lines of. No. VIII, titanum, chromium, and aluminium, 957.

 of chlorinated organic compounds, properties of, 470.

- specific heat of, 340.

— transpiration of, 504.

Variscite, 541.

Varnish, aqueous, for prints on unglazed paper, 212.

Vauquelinite, 1109.

Vegetable liquids, sterilisation of, 835. substances, inflammability of, with

nitric acid, 771.

Vegetation, influence of electric light on, and on certain physical principles involved, 962.

Venasquite, 379.

Veratric acid, 740.

Veszelyite, 369.

Viburnin, 104.

Viburnum prunifolium, 104.

Vicin, 1158.

Vinegar, manufacture of, by means of bacteria, 128.

- testing for sulphuric acid in, 314. Vines, manuring of, 121.

Vinyl bromide, polymerisation of, 400. Viscose, 1024.

Vitellin, Weyl's, 625.

"Vitrified forts" at Craig Phadrick,

Inverness, and Hartmannswillerkopf. Haute Alsace, examination of the materials of, 703.

"Vitrified forts," examination of the material of, French, 394.

Vivianite, 549, 690.

artificial production of, 1000.

Volborthite (?), 1108.

Volcano, Monte Ferru (Sardinia), products of, 700.

Voltaic cells, 3.

currents, influence of, on the diffusion of liquids, 963.

Voltameters, reduction of observations on, 963.

Volume constitution of formates, 496.

— of liquid compounds, 220.
— of sulphates, chromates, and selenates, 137.

Volume relations of some haloïd salts,

Volumetric analysis, use of potassium permanganate in, 759.

Vulpic acid, 97, 173, 1036.

## W.

Wackenroder's solution, polythionic acids contained in, 1098.

Waldivin, 441.

Wapplerite, 532.

Warmth in soils, 1071.

Water, action of, in the process of irrigation, 638.

- decomposition of, between platinum electrodes by the discharge of a Leyden jar, 962.

- decomposition of, by metallic iron,

---- drainage, from moorland, 117.

 foul, purification of, 854. from a hot spring, Fiji Islands, analysis of, 564, 1019.

- from a hot spring, New Britain, analyses of, 564, 1019.

- heat-phenomena of the solution of, in alcohols, 9.

luminous spectrum of, 1.

mass-influence of, 497.

- permeation of, through the soil. 1071.

- spectrum of, 957.

650.

thermal conductivity of, 966.

Water-residues, estimation of carbon in. 197.

Waters, ferruginous carbonated, 1112. - natural, relation between the oxygen and organic matter found in, Waters, natural saline, existence of boric acid in, 1019. - of the Assiniboine and Red Rivers, Canada, analyses of, 562. - potable, action of potassium permanganate on, at different temperatures, 1172. potable, destruction of microscopic animals in, 1179. -- detection of lead in, 1173. estimation of nitrates in, 1173. estimation of organic carbon in, 196. - relation of the number of fish to the lime present in, 630. - various, relations between oxygen and organic matters in, 1087. Wattevillite, 370. Wavellite, 528. Wax, examination of, 316. Weldon-mud and similar substances, composition of, 323. Wheat, continued cropping of, 638. — manuring, with salt petre, 938. — new English kinds of, 1065. Wheat ashes, composition of, 754. Wickerheim's preservative fluid, 126. Wilkinson's process for the manufacture of gas from wood, 769, 954. Wicklow, mineralogy of the county of, Wine, analyses of, 1099, 1182. - detection of aniline colours in, 659. - artificial colouring - matters in, by means of the spectroscope, 852. - logwood in, 761. — — rosaniline in, 314. estimation of gum in, 199. — quinine in, 1176. explosion produced while heating, 479. from raisins, 198. — influence of acids on the preservation of, 1090. — influence of, on digestion, 752. ---- ropy, action of cold on, 951. — testing for sulphuric acid in, 314. Wines, estimation of the residues of, 1086. - from cloudberry and cranberry, 331. Italian, fermentation of, 1090. Russian fruit and blackberry, 209. Wolfram, 995. Wood, dry distillation of, 332. — ground, as horse litter, 1077. — hardness and resistance of, 132.

Wood-spirit, assay of, for the prepara-

tion of methylated spirit, 1174.

Wood-spirit for making methylated spirit, 942.

Wool, relation of, to body weight in merino sheep, 1054.

Wool and silk, separation of, in textile fabric, 1177.

Wool waste, analysis of, 661.

--- as manure, 937.

 $\mathbf{W}$ ulfenite, 1109.

### X.

Xanthochromium compounds, 1104. Xanthophyllite, 233.

Xanthoxylum, 105. Xenylamine (paramidodiphenyl), derivatives of, 175.

Xylene, action of chlorochromic acid on, 581.

--- action of nitrogen peroxide on, 584. - nitro-, oxidation of, 420.

Xylidine, acetonitro-, 433.

---- anhydro-compounds from, 1132.

---- new, preparation of, 433.

--- oxidation of, 420.

—— ferrocyanide, 261. Xylidines, isomeric, 433.

--- nitro-, 420.

# Y.

 $Y\beta$ , absorption-spectrum of, 349. Yeast, 928.

- incapable of producing an invertive fermentation, 632.

- influence of Rochelle salt on the activity of, 1058.

microscopic researches on, 835.

- pressed, estimation of starch in, 943.

examination of, 1183.

souring of, 951.

Yttrium group, absorption-spectra of some metals of, 349.

Yttrotantalite, 382.

# Z.

Ziemann's process for the manufacture of butter and cheese, 952.

Zinc, detection of, in toxicological cases, 194.

—— distillation, 325.

—— electrolytic estimation of, 1170.

---- glycidate, 713. molecular properties of, 685. Zinc, separation of, from cadmium, 849.

Zinc and copper, separation of, by precipitation with sulphuretted hydrogen, 467.

----- sulphochromite, 226.

Zinc-spinell, conversion of the distillation-vessels of zinc-furnaces into, and tridymite, 520.

Zinc-spinell from Brazil, 696.

Zinnwaldite, 692.

Zircon, 550.

Zoïsite, 1003.

comparison of, with epidote, 1004.
 (thulite), crystallographic examination of, 398.

Zündererz or tinder-ore of Clausthal, 24.